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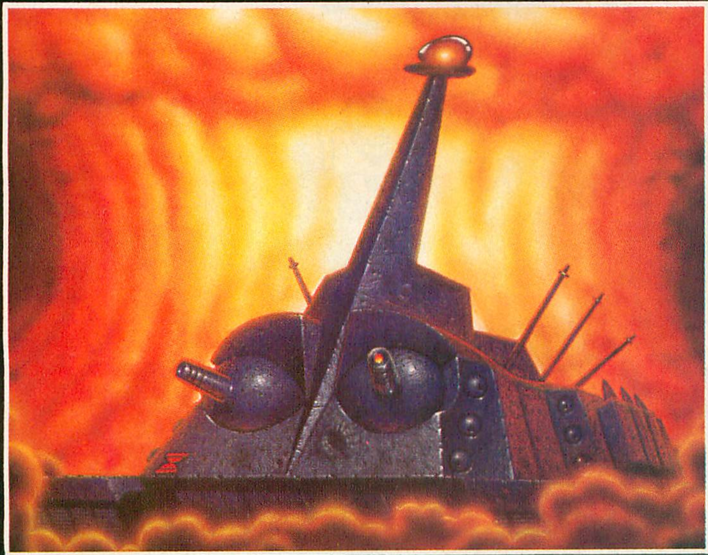
CIRCLE 074 ON READER SERVICE CARD

Origin Systems,
creators of the award-winning Ultima® series, presents:



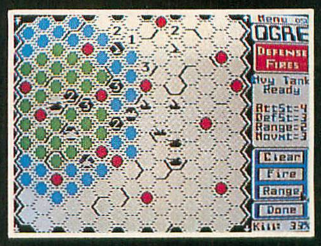
Total war against a juggernaut fighting machine by Steve Meuse

Available on Apple®



A strategy game for one or two players, OGRE pits an array of infantry and armored forces against a single cybernetic supertank, bristling with weapons—the OGRE.

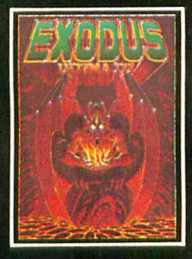
Adapted from the classic Steve Jackson board game, Computer OGRE epitomizes simplicity and play balance. Players can use standard game maps or design their own.



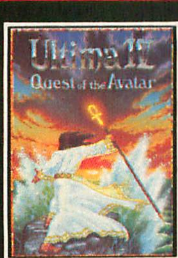
Using the RANGE option, a heavy tank considers its move and fire range.

OGRE—
the challenge of a lifetime is waiting.

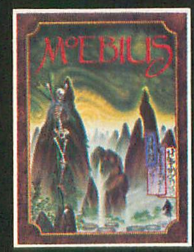
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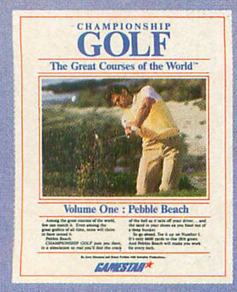
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GAMESTAR Championship Series

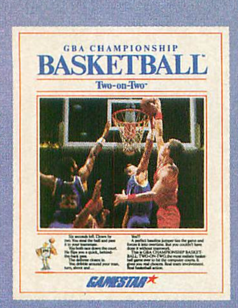
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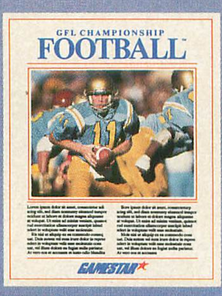
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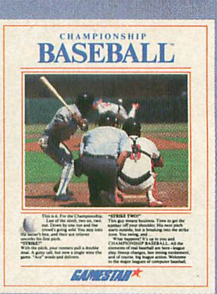
Available for IBM PC, PCjr and Tandy 1000, Commodore Amiga, and compatible computer systems. Coming soon for Apple II, Atari ST and compatible computer systems.



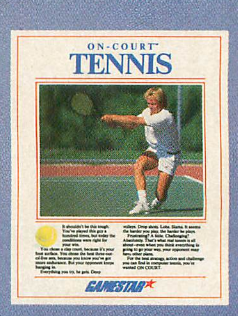
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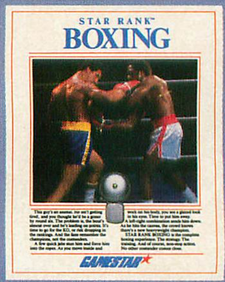
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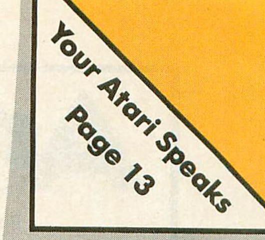
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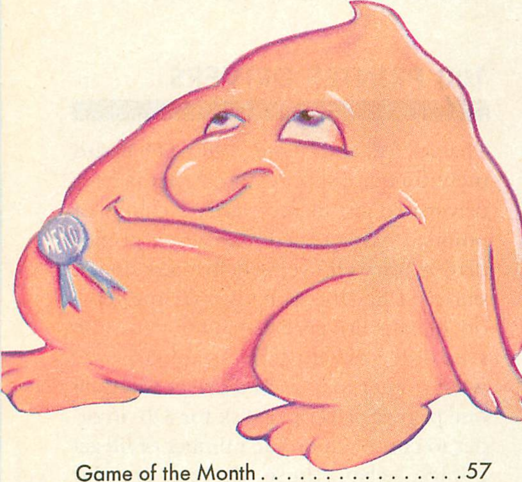
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ST RESOURCE

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[RETURN]

What is the ATASCII code for the [RETURN] key? My books give the code only for [INVERSE]-[RETURN].

Thomas Westbrook
Oakland, CA

The ATASCII code for [RETURN] *is 155, which gives both a carriage return and a line feed—as if you had both a CHR$(10) and a CHR$(13) from standard ASCII. Now you know why certain printers and terminal programs act weird with your Atari.*—ANTIC ED

RECURSION BASIC

Here is a short routine that *imitates* a recursive routine in Atari BASIC—which does not allow recursion.

Robert Condella
Brooklyn, NY

```
10 REM FIBONACCI SERIES
20 ? "Input Number : ";:INPUT NUM
30 X=1:Y=0:N=0
35 ? "h(1) = 1 + 0 = 1":REM BY DEFINITION, FIB. SERIES BEGINS 1, 1, 2...)
40 GOSUB 1000
50 END
1000 FIB=X+Y
1010 ? "h(";N+2;") = ";X;" + ";Y;" = ";FIB
1020 Y=X:X=FIB:N=N+1
1030 IF N+2<=NUM THEN GOSUB 1000
1040 RETURN
```

TOO MUCH SPACE

I designed a 4×8 pixel character set that is half the size of normal Atari characters. When I use it, there's a big space between each character. How can I get rid of the spaces so I'll have what I miss most from my Atari—an 80-column display.

Kenny Davis
Greensboro, NC

You need to know how to do two things. First, you'll need a new screen editor handler—not easy to program unless you're well-versed in machine language. You'll also need to display your new form of text on a Graphics 8 screen (ANTIC Mode F), which happens to be just wide enough for 80 columns at the expense of about 8K of RAM. If this task is too big, you might try an 80-column modification such as Omniview ($69. CDY Consulting, 421 Hanbee, Richardson TX 75080. 214-235-2146.), which works well with certain programs.—ANTIC ED

MENU-DRIVEN DISKS

Can you help me find a method for a menu-driven disk? I'd like to load the menu with a RUN command and then choose the programs listed on the menu.

Kurt Hoffstadt
Oreland, PA

Each month's Antic Disk (the one packaged with the magazine) contains a disk menu program that you can copy and adapt for your own uses. Or see Menu Maestro *in this issue.*—ANTIC ED

100 PRINTER DRIVERS

Thanks for your June, 1986 I/O Board mention that I supply AtariWriter printer drivers. I'd just like to clarify a couple of points: I have created AtariWriter printer drivers for well over *100* printers since I started selling them on my own in 1984—not just the drivers listed in I/O. Anybody who orders directly from me must specify what printer they want a driver for. I sell one printer driver per disk for $10, in order to cut down on the number of illegal copies. Also, these drivers are for AtariWriter only, not AtariWriter Plus.

Gary Furr
P.O. Box 1330
Mountain View, CA
94042

DEAF TELECOMMUNICATIONS

I am interested in using my 800XL, 850 interface and modem to converse with TTY teletypes used by the deaf. If any readers know how to use an Atari for this I would appreciate their contacting me directly.

Lowell Goldberg
Canarsie Volunteer
Ambulance Corp.
1106 E. 95th Street
Brooklyn, NY 11236

continued on page 8

"IF YOU WANT

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— JACK POWELL, ASSOCIATE EDITOR, ANTIC MAGAZINE

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• Write to us for our full color catalog of products for the APPLE, APPLE MACINTOSH, ATARI, ATARI ST, COMMODORE, COMMODORE AMIGA, and IBM SYSTEMS.

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You can upgrade the original Degas to the new Degas Elite by returning your disk and $40.00 (U.S.) to Batteries Included.

CIRCLE 018 ON READER SERVICE CARD

HARD TIMES

I use business software (Letter Perfect, Data Perfect and SynCalc) on my 8-bit Atari, and I find that none of my software will work with my new SupraDrive 10Mb hard disk. What business software does work with the Supra?

Del Jenson
Blackfoot, ID

The software you named doesn't work with the Supra hard because of non-standard disk formatting as well as copy protection. As we stated in our October, 1986 hard disk issue, a lot of older Atari commercial software is copy-protected and doesn't load onto hard disk. But you can archive data files to it. Naturally you can use your disk for non-copy-protected commercial software (check before you buy) plus public domain programs and the programs you write yourself. And they're great for running a BBS.

Fortunately, because of the near-universal usage of hard disks in business microcomputing, the trend is for new productivity software **not** *to be copy-protected. But right now—if most of your computing is being done with pre-1987 commercial software for the 8-bit Atari—you will find that a hard disk is best suited for archiving most inactive data files. (If you can manipulate a file wtih DOS 2 or DOS 2.5, you should be able to archive it on a hard disk.) Of course, don't forget backup floppies.*—ANTIC ED

DOWNLOADS, CONTROL CODES

I'm desperate! I've read my Star NX-10 manual from cover to cover and I still can't download my own character sets to the printer. I've tried FontMaker without success.

Josh Stark
Norman, OK

Examine the DIP switches located under a cover, in the front, on the right. Switch 2-1 ignores download characters in the "on" position and enables downloads in the "off" position. For further information, consult pages 132-134 of the manual. The NX-10 is supposed to be compatible with commands of the Epson FX-85. If you still have no luck, call Star Micronics at (212) 986-6770.—ANTIC ED

B/GRAPH TRADEMARK

The November, 1986 issue of **Antic** contained a type-in graphing program called *V-Graph*. In the opinion of Batteries Included, this name is too close to the trademarked business graphics and statistical software **B/Graph** ($39.95) published by BI under license. The similarity is likely to cause confusion in some readers' minds.

Companies such as BI spend considerable effort and money in promoting their products such as B/Graph. A product's name becomes a valuable asset, so we would appreciate it if you informed your readers that BI's B/Graph business graphics program shouldn't be confused with the type-in program that appeared in your November issue.

Michael Reichmann
President
Batteries Included

Antic *had absolutely no intention of infringing on the B/Graph trademark and we sincerely regret any confusion which may have arisen. We retained the author's V-Graph title for that November listing simply because the program accepts* **Visicalc** *spreadsheet files and produces* **Graphs**. *It seems to us that* ***Antic*** *readers already realize even the most ambitious magazine type-in listing is necessarily limited by space considerations—and therefore cannot be compared to a full-featured professional product such as B/Graph*—ANTIC ED

EXPRESSIONS

After reading hundreds of software reviews, I feel that the writers know a lot about computers but little about applications. Case in point: Express from the now-defunct Mirage Concepts. This early ST program was universally panned. But the critics didn't understand that this program is a simple but effective letter processor, not a full-featured word processor.

Express might not have some of the bells and whistles of other ST word processors. But it does have uniquely useful features, such as automatic envelope addressing and a typewriter mode for filling out forms. I use Express most of the time because it was designed for the kind of writing done by real people. Of my 30 ST programs, Express was by far the best buy.

Ray McAlpin
Park Ridge, IL

Help!

ST CASTLE

Although *ST Castle* (October, 1986) works correctly, the display incorrectly left out border lines on the menu boxes. Type in the following line to complete the display:

```
1645 linef X2,Y2,X1,Y2:linef X1,Y2,1,Y1
```

DIGITAL GARDENER

The Digital Gardener (May, 1986) program RUNs as published. However, several readers have had trouble using the program to design very large gardens. Garden designs with more than 15 different types of vegetables) will generate an ERROR 9 AT 2990 message.

To adjust the program so it will accept larger values, change ROWS(15) and ROWZ(15) in line 1020 to ROWS(30) and ROWZ(30).

However, screen plots of such immense gardens will not have enough room to display all the vegetable labels and will therefore be somewhat inaccurate. **Antic** suggests that you divide large garden designs into sections with fewer than 15 different types of vegetables, and process each section separately.

Antic *welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.*

Send letters to: Antic I/O Board, 524 Second Street, San Francisco, CA 94107.



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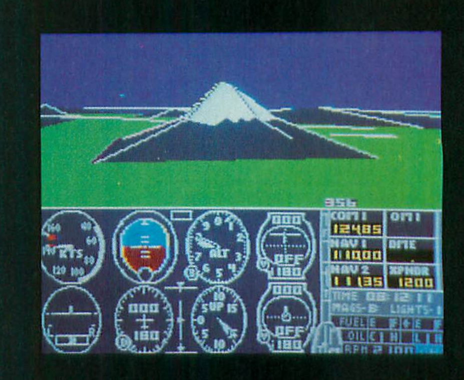
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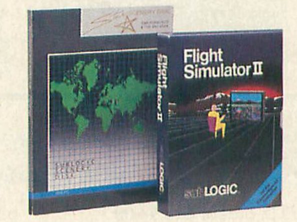


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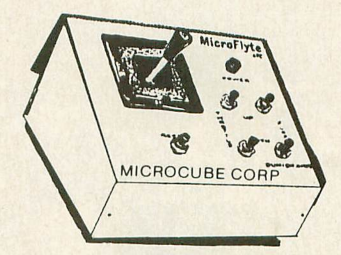
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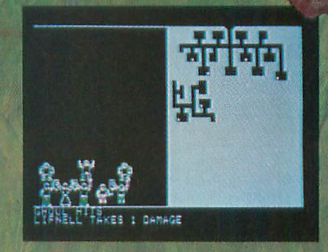
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JANUARY SPECIAL FEATURE

Talking Typewriter

Atari spells it out—8-bit or ST

BY BILL MARQUARDT, ANTIC TECHNICAL ASSISTANT

***Talking Typewriter is a relatively easy software/hardware project that lets you add computer-spoken letters and numbers to your own programs—for Atari 8-bit or ST computers. You need to know how to solder and follow schematic diagrams. This BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette. Optional speech modules have been added to two of the other 8-bit programs in this issue—*Door Prize *and* Math Attack.**

Now your Atari can talk to you. **Antic's** latest hardware-software project will enable *any* Atari computer to speak letters and numbers aloud as you type them from the keyboard. And the Talking Typewriter program—in either the 8-bit or ST version—is short enough to be inserted as a speech module in your own programs.

Two other 8-bit programs in this issue—*Door Prize* and *Math Attack*—have been modified to produce speech when used with the Talking Typewriter circuit. See the specific speech add-on instructions in each program article.

The Tandy SPO256-AL2 speech synthesizer chip ($12.95, part number 276-1784) is the heart of this project. Tandy has assured **Antic** that Radio Shack will continue to carry this chip for some time, so availability should not be a problem. We currently don't know of a 100%-compatible substitute speech chip.

> *ST OWNERS: See* Machine Language Talker *in this issue's ST Resource for full explanation of the ST version of this program. However, you'll need to read the relevant hardware sections of this article—particularly BUILD THE CIRCUIT, AMPLIFIERS and ST INTERFACE—in order to build the Talking Typewriter circuit board.*

The Talking Typewriter circuit is easier to build than the *WEFAX* circuit board in the September, 1986 **Antic**. It is a suitable project for beginning hardware hackers. And after your hardware is properly built and connected, producing speech is surprisingly simple. The 8-bit and ST Talking Typewriter programs look for a keypress and use the synthesized voice to tell you which key was pressed.

ST OWNERS: You need to see *Machine Language Talker* in this issue's ST Resource for a full explanation of the program's ST version. Skip to the hardware sections of this article for information on building the Talking Typewriter circuit board.

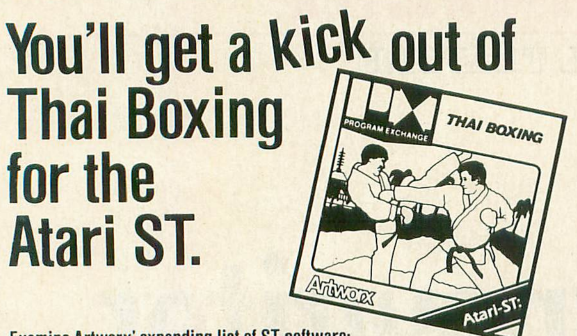
8-BIT OWNERS: Type in Listing 1, TYPETALK.TLK, check it with TYPO II and SAVE a copy before you RUN it. BASIC programs written for the Talking Typewriter circuit will normally be given the .TLK extender.

8-BIT TAKE-APART

Atari 8-bit computers have at least two joystick ports that are programmable as either input or output ports. Four pins from each of the two ports combine to provide an 8-bit byte. PORTA (pronounced port A) at location 54016 ($D300), is associated with joystick ports 1 and 2. In or-

continued on next page

You'll get a kick out of Thai Boxing for the Atari ST.



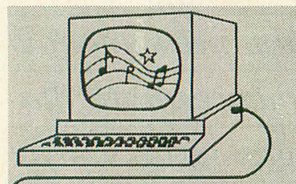
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der to set up PORTA properly, we will use the PORTA controller, PACTL, location 54018 ($D302).

Six address lines are required to access the 64 speech sound components—called "phonemes"—encoded within the SPO256 chip. (For some reason, the chip's documentation calls its speech sounds "allophones" instead of phonemes.) An example of phonemes would be the "th" sound in words like "the" and "those." The speech chip's phonemes combine to form recognizable speech when amplified and sent through a speaker.

Bits 0-5 of PORTA will be used as the address lines for output. Handshaking (communication control) between the speech chip and your Atari requires two signals. One is called ALD (Address LoaD) and is an output line. Whenever the computer tells the speech chip that it wants to load an address into the chip, it must pulse the ALD line LOW (change it from a 1 to a 0). Bit 6 of PORTA will be used for ALD.

The remaining signal will be an input to the computer and is called LRQ (Load ReQuest). Whenever the speech chip wishes to signal the computer that it is ready to receive an address it will pull this line LOW (make it a 0). Bit 7 of PORTA will be the LRQ line.

Lines 15-17 of the program use the variable P to store the value curently in PACTL. Subtracting 4 from that value clears bit 2 (makes it a zero, or LOW). This tells the Atari's operating system (OS) that we want to determine which bits of PORTA are used for input and which are used for output. To accomplish this, we have to POKE PORTA with a byte that represents the pattern of input and output lines we want.When the bit is set (equal to 1), the OS is informed that the corresponding line will be used for output. A 0 in the bit will signify input. Using the information above, the resulting byte is equal to 127. We POKE this value into PORTA and then return PACTL to its original value by POKEing it with P.

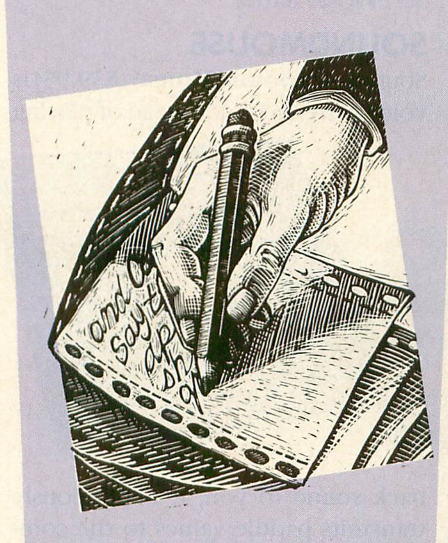
Line 60 monitors the LRQ line, waiting for it to go LOW. Since LRQ is bit 7 of PORTA, it will be represented as a value of at least 128. After LRQ goes LOW (PEEK(54016)<128), program control passes to Line 70. We obtain the data byte which represents one of the 64 phonemes and add 64 to it.

This sets bit 6, the ALD line, and makes it a 1. POKEing PORTA with this value places the address onto the address bus, where it waits until we pulse ALD to LOW (make bit 6 a 0)—which is exactly what happens when we POKE PORTA with our original data byte *without* the 64 added. It is this transition from a HIGH to a LOW that causes the speech chip to accept our data.

Use this routine to add speech to BASIC programs. Just be aware that the program might not immediately work properly because of timing requirements of the speech chip. For instance, when I combined different program lines into one BASIC line, I obtained no speech at all, even though the order of the commands was the same. You may have to experiment with your particular program, perhaps using a short time-delay loop between instructions.

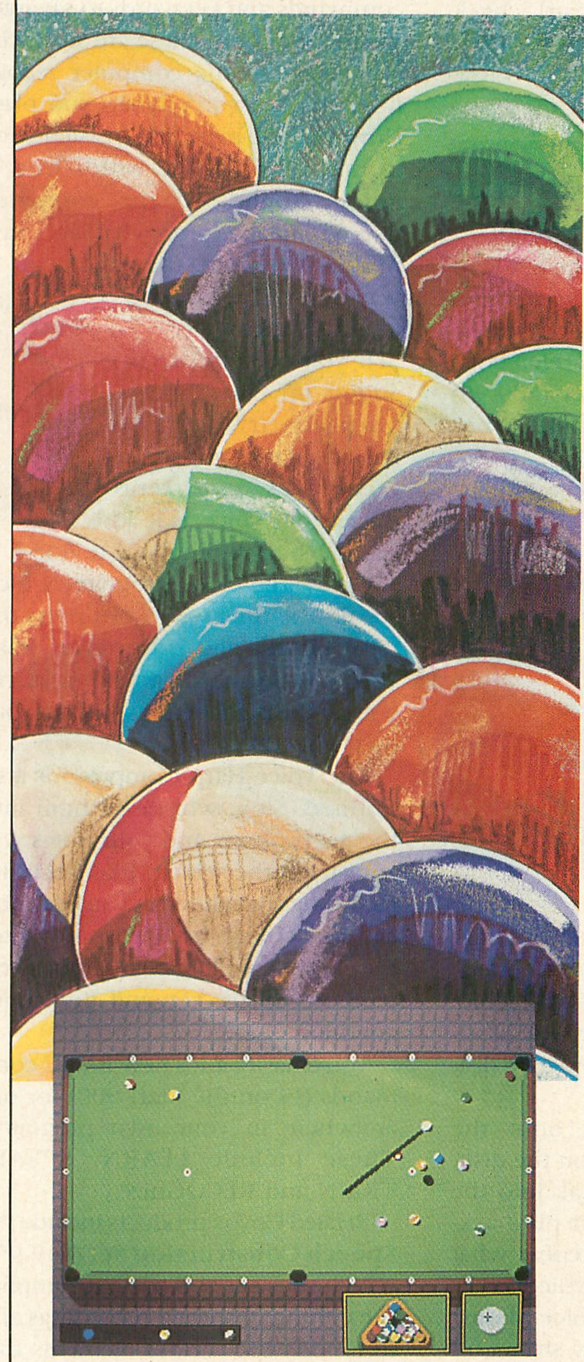
continued on page 19

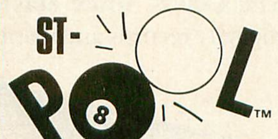
Coming Next in February 1987 Antic



- Word processing: 8-Bit Software Comparison Review
- Fog Indexer—for 8-bit and ST
- Bill Wilkinson on 130XE RAM Banks
- J.D. Casten's Rebound Screen Maker
- Inside the Atari Base BBS
- Users Group of the Month

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CIRCLE 059 ON READER SERVICE CARD

BY GREGG PEARLMAN, ANTIC JUNIOR EDITOR

For Sale: Atari Voices

Speech-related products for 8-bit and ST

If you are interested in experimenting with computer speech, but don't wish to build this issue's *Talking Typewriter* circuit board, check out the following products for Atari 8-bits and STs.

8-BIT

COVOX VOICE MASTER

A voice synthesizer like the SPO256 chip used in *Talking Typewriter* creates speech electronically by stringing together artificial sound elements. The **Covox Voice Master** ($89.95) digitally records and manipulates your



own voice, storing the electronic signals in the memory of your Atari. Voice Master consists of a small white box, a telephone operator-type headset, connecting cables, a program disk and documentation.

Put on the headset, boot the demonstration program on the disk, press [R] for record, speak into the microphone, press [P] for playback, and the computer will repeat what you said—in your own voice.

Play blackjack with Voice Master. This demonstration really shows off its voice-recognition capabilities. *Say* how much you want to bet, whether you'll hit or stand, and Voice Master will respond accordingly.

First you're given a list of blackjack commands and keywords to say into the microphone. These are stored in memory, and the computer recognizes the keywords when you play. However, you must be consistent. Try to make sure all the words have a unique sound, so the computer doesn't misinterpret what you say. And say the words the same way you did when you recorded them.

If you need to practice adding up cards for black-jack, try the talking calculator, which recognizes *and* reproduces your voice as it adds, subtracts, multiplies and divides.

Or try the clock program, which speaks the time when you press the [SPACEBAR], and it can even wake you up in the morning with the alarm you set the night before—also in your own voice.

The Voice Harp Composer is also featured. Sing, whistle or hum into the microphone and your notes will appear on the screen. Play back the recording and edit what you hear. You can add, change or delete notes, alter the note lengths, change octaves, tempos, voices, key and just about anything else.

Voicemaster adds new BASIC commands (19 on the Atari 800) for use anywhere in your own programs. These include LEARN, SPEAK, TRAIN and RECOGnize.

Related Covox products include the **Speech Construction Set** ($49.95), which uses cut-and-paste to simplify the editing of speech recordings and to modify the various elements that constitute the speech. The **Talking Disk** ($5) gives a taste of what can be used in your own programs and has speech examples in English, Spanish and German.

Covox Inc., 675-D Conger Street, Eugene, OR 97402. (503) 342-1271.
CIRCLE 270 ON READER SERVICE CARD

SOUNDMOUSE

Soundsoft's **SoundMouse** ($39.95) is voice-activated, but instead of playing



back sound to you, it continuously transmits paddle values to the computer. It plugs directly into the joystick port and listens—low-pitched sounds are what it hears best.

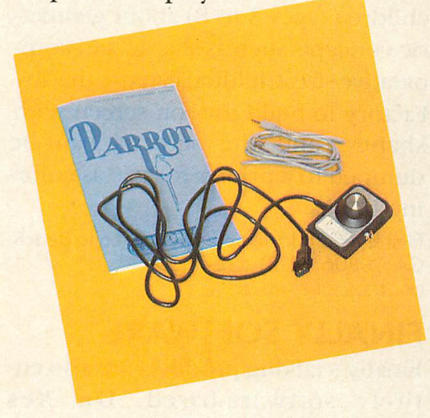
A sensitivity control lets the SoundMouse respond to a wide range of noises, making it suitable for an equally wide range of applications. The package includes imaginative games and graphics that demonstrate the sensitivity of the SoundMouse. The graphics program demonstrates displays that flash or change color, depending on the sound you make. The SoundMouse Band—a guitarist, drummer and keyboard player, keep up with the beat of any music you play nearby.

Soundsoft Inc., P.O. Box 740, 10 Maple Avenue, Andover, NJ 07821. (20) 786-6060.
CIRCLE 271 ON READER SERVICE CARD

PARROT

Alpha's **Parrot** sound digitizer ($39.95) can put the Beatles, Ella Fitzgerald, the Vienna Boys Choir or anyone else on your Atari. And not just

singers—the Parrot can play back almost anything, from birds singing to sirens blaring. The Sound Sampler hardware plugs into joystick port 2 and feeds the sound into the computer. Its mini-plug jack accepts sounds from microphones, tape recorders, radios, televisions, VCRs or compact disk players.



The software includes programs for the Sound Sampler, the Emulator, a BASIC subroutine and demos. The BASIC subroutine can be added to your own BASIC programs to play sounds you've created or saved with the Parrot.

The Emulator processes the sounds saved with the Sampler. You can manipulate them in almost any way, creating unique special effects. The Sampler graphs the sounds and allows modification with the joystick.

The Play mode turns your computer's keyboard into a synthsizer. You can load sounds you've created, select the type of sound you want—horns, telephones, etc.,—and the top three rows on the keyboard give you three octaves of notes for each sound.

Alpha Systems, 4435 Maplepark Road, Stow, OH 44224. (216) 374-7469.

CIRCLE **272** ON READER SERVICE CARD

ST

1ST BYTE PRODUCTS

These talking, graphics-oriented ST software packages ($49.95 each) are educational products containing reinforcement-type activities for children ranging from pre-schoolers to seventh-graders. No add-on hardware is required.

MathTalk lets your children enter their own arithmetic problems from school. **Speller Bee** is a spelling tu-

continued on next page



After extensive development and 16-bit GEM technology application, RAOS (Rat Actuated Operating System) is now ready for 8-bit Atari computers. Using efficient memory management and data manipulation, RAOS creates a powerful windowing environment, yet uses an incredibly small amount of memory.

It totally transforms your computer. Your Atari's operating system now has the GEM features of the ST, like a mouse-controlled *arrow-pointer*, which is used to open the *pull-down menus* or select *icons*, or open *multiple screens* or *windows*, all at the click of a RAT button!

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We designed RAOS around you. Routines such as the mouse controller make using the digital SuperRAT in your own programs as simple as a single PEEK command! Our DESKTOP program Z-DOS, included in RAOS, lets you access your disk files with ease, replacing keyboard input with icons and the arrow-pointer, just like the MacIntosh™ and ST systems. RAOS also can use the original RAT.

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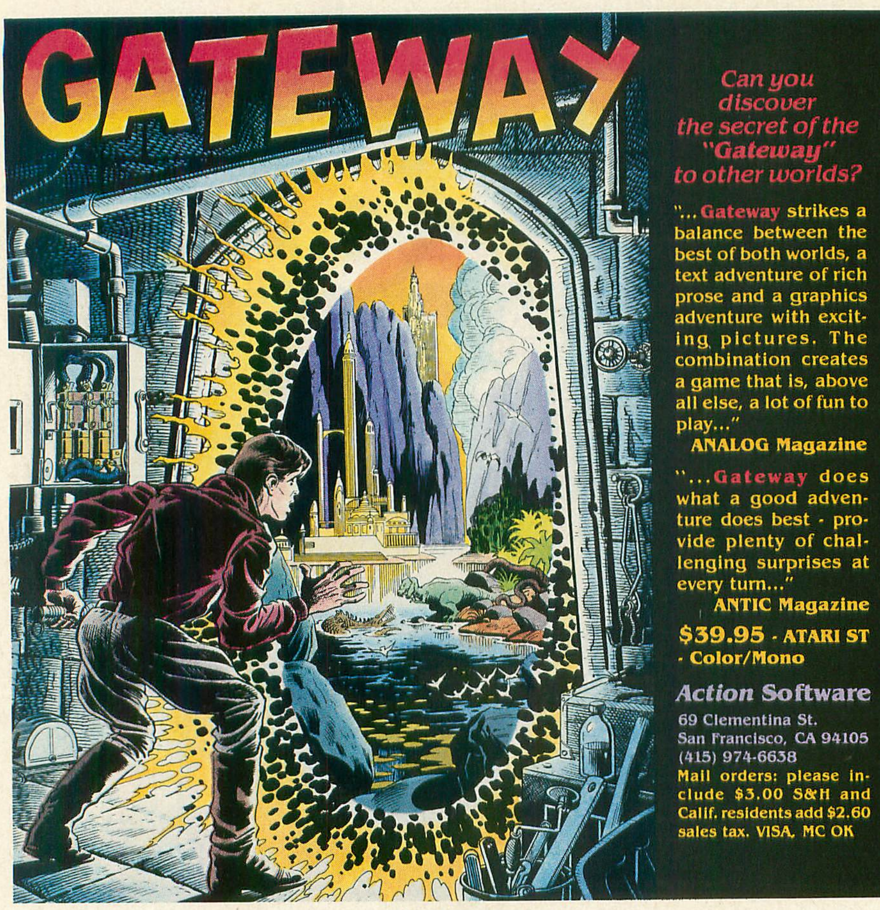
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tor that lets children enter words from their own spelling lists.

KidTalk, a creative-writing program, lets you combine male and female voices to tell stories you've written. It will read them back by word, letter or sentence, and you can control speed, pitch and tone.

First Shapes teaches younger children (ages 3 to 8) about geometric concepts such as shapes and comparative size. Children can use the Toy Factory to build toys on screen with shapes, and the screens can be dumped to a printer for use as coloring books.

First Byte, 2845 Temple Avenue, Long Beach, CA 90806. (213) 595-7006.
CIRCLE 273 ON READER SERVICE CARD

FINALLY SOFTWARE

Finally's talking products are also entirely software-based. **Dr. Xes** ($49.95) is a sophisticated talking version of the famous Eliza program, a mainframe-based artificial intelligence emulator developed in 1966 that mimics a psychotherapy session.

Talker ($69.96) is a full-function, talking word processor that can read text back word for word, or by character or sentence. The program is a great tool for the sight-impaired who can touch-type or have a large-character keyboard. Talker uses pull-down menus and a straightforward command structure.

Senor Tutor ($69.95) speaks and teaches conversational Spanish, taking in standard phrases for travelers. Lessons change, so you never see the same ones twice, and variable quizzes help monitor your progress.

Finally Software, 4000 MacArthur Boulevard, Suite 3000, Newport Beach, CA 92663. (714) 854-4434.
CIRCLE 274 ON READER SERVICE CARD

HIPPO SOUND DIGITIZER

Sample, modify and play back up to 40 seconds—about 20K of memory—of high-quality sound with this hardware/software package. The **Hippo Sound Digitizer** ($139.95) can edit sounds, copy, cut-and-paste and reverse them, save and load them to disk, or produce real-time echo and reverberation effects.

Hippopotamus Software, Inc., 985 University Avenue, Suite 12, Los Gatos, CA 95030. (408) 395-3190.
CIRCLE 275 ON READER SERVICE CARD

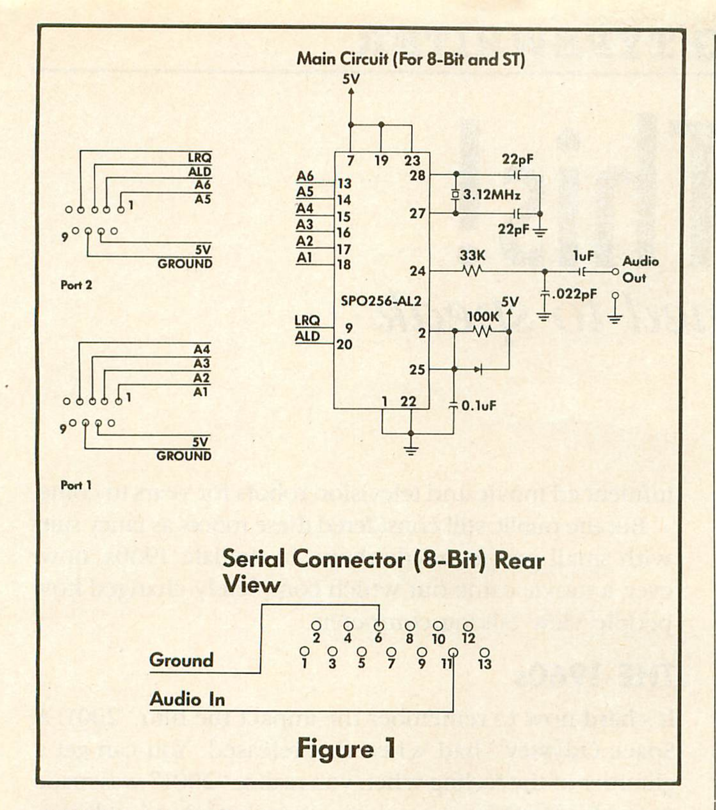


Figure 1

TALKING TYPEWRITER
continued from page 14

PART II: HARDWARE

BUILD THE CIRCUIT

Essentially, we only need eight lines of communication between our computer and the SPO256 speech chip. Six lines (A1-A6) are used to determine which of 59 phonemes or five pauses is selected.

Speech data for the phonemes are located within the internal ROM of the chip. Two other lines are LRQ and ALD, described above. A list of all the phoneme addresses and their associated sounds is included with the SPO256 chip, along with a more detailed explanation.

In *Figure 1*, pin 19 is the strobe enable. By wiring this pin to 5 volts (HIGH), we're telling the chip to operate in Mode 1, which is one of two posible modes of operation for the speech chip. In this mode, the chip will accept an address whenever ALD pulses LOW.

In operation, we simply wait for LRQ to go LOW. When this happens, we send out a phoneme address to the speech chip with ALD set HIGH and then pulse ALD LOW, telling the chip to load that address. You are likely to think of these addresses as data, but technically they are actually addresses as far as the speech chip is concerned.

However, what's important is that we send a number between 0 and 63, which corresponds to a particular speech component (phoneme). We do this for each phoneme in the string of phonemes that make up the word to be spoken, making sure to end the string with a pause in order to turn off the sound.

While the Radio Shack specifications call for a 3.12 MHz crystal to provide the proper oscillator frequency, a 3.59 MHz crystal is much easier to find. Our results with the

continued on page 21

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STAccount provides you with on screen help through the use of TEDDY, a screen icon. If you become uncertain of your actions during the course of running the program, just click the left mouse button on TEDDY and a help screen for that particular section of the system will appear.

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STAccounts Report Generator is a powerful tool integrated into the system. It will allow you to reconfigure reports using any of the system information. Provided with the system are a number of default reports which can be altered, amended, or entirely reconfigured for your individual company's needs, or create new reports as to your company requirements.

SYSTEM CONFIGURATION

STAccounts is designed to be used with either a 520 ST or 1040 ST, 0.5 or 1.0 megabyte drive with monochrome or colour monitor.

STAccounts and TEDDY are trademarks of Silicon Chip Limited
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By: R. Constan c1985

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CIRCLE **032** ON READER SERVICE CARD

Now Hear This!

How the computer learned to speak

BY PATRICK BASS, ANTIC ST PROGRAM EDITOR

THE 1930s

Most of us are already used to hearing a machine talk. However, 20 or 30 years ago the very notion that a machine could talk was met with disbelief by the general public. There *were* talking machines, but if you closely examined most of them you would probably find a wire running behind a curtain where someone would stand like the Wizard of Oz and speak into a microphone. Typical "mechanical men" in the 1938-39 New York World's Fair were built this way.

Linguists had long realized they could break human speech down into distinct, separate parts, each composed of a single sound. These individual parts of speech are called "phonemes" (FO-NEEMS). There are roughly 64 different phonemes in human speech, and by using just phonemes we may reproduce nearly any language spoken on Earth.

THE 1940s

Before World War II, people had started building electronic circuits which could produce individual phonemes. These early voice synthesizers were operated by a keyboard much like one found on a piano. Each key would produce a different phoneme when pressed. Skilled keyboardists could actually make the phoneme machine "talk".

People didn't think of the machine as *really* talking, however, because they could see a live human being pressing keys to make the noise. The voice quality wasn't anything to write home about, either. For a machine to talk by itself, it needed to press its own speech keys correctly. And that required the one component which didn't exist at the time—a computer.

THE 1950s

During the 1950s and early 1960s computers were big, clanking machines which were fed data by men wearing white coats. They were inaccessible to most people, and still held a certain *mystique*. People tended to believe that computers were all-powerful and, with the proper instructions, could do anything.

However, Hollywood had different ideas. A room-sized computer was impressive, but for dramatic purposes, impractical. In the mid-50s they dressed up a computer with arms, legs, a plastic bubble on top, and a *voice*. Robbie the Robot co-starred in the movie "Forbidden Planet" and influenced movie and television robots for years to come.

But the public still considered these robots as fancy suits with small people inside them. In the late 1960s, however, a movie came out which completely changed how people view talking computers.

THE 1960s

It's hard now to remember the impact the film "2001: A Space Odyssey" had when first released. You can get a glimmer of the feeling when you realize "2001" was made *before* high-tech moviemaking came along, but is still considered the "standard" space-effects movie to beat. Before "2001" came along, talking machines, like Robots, were thought of as good-natured friends with machine-like speech. HAL changed all that.

You could only see small parts of HAL. It was integrated throughout the spacecraft with the only visible parts—outside the computer room—being its TV "eye." A human actor actually spoke HAL's words, but the public was fascinated by the idea of a disembodied computer conversing in a natural-sounding voice as it denied its plot to kill the crew. People left the theater believing that computers would soon be speaking as well as HAL, if not better.

THE 1970s

In the early 1970s, Votrax, a division of the Federal Screw Works, was told to build and implement a computer that would talk electronically. Votrax built many different talking machines for the Government and eventually marketed a talking computer board that could be slipped into home computers. While Votrax laid most of the groundwork for computer speech, Texas Instruments was busy putting the 100-plus individual parts of the Votrax Speech Synthesizer on a single integrated circuit.

Towards the tail end of 1970s, Texas Instruments introduced their talking chip set in a children's toy, the TI Speak & Spell. The computer would say a word and challenge the child to spell it, using the built-in keyboard. This was probably the first consumer product offering built-in computer-generated speech. About the same time, Votrax introduced a complete line of plug-in speech boxes for almost any computer, most notably the Tandy TRS-80.

THE PRESENT

Today, there are many different talking appliances. We have Coke machines and games and automobiles that talk.

Soon, nearly every appliance will have a voice.

There are two different approaches to speech synthesis, each with its own advantages and disadvantages. The first type gives almost completely natural sounding speech. In fact, almost any sound can be reproduced with it. To do it, the computer is literally turned into a digital tape recorder. Sound is digitally *sampled* in real time, and stored in RAM memory.

To play the sound, the RAM is read back and stuffed out a speaker as fast as it was sampled. While this method can produce remarkable high-fidelity sound, sampling is horribly memory-intensive. For example, the Covox Voice Master for the Atari 8-bit uses—typically—32K to store about 15 seconds of sampled sound.

The second way to reproduce speech is to use hardware to remember how to produce the different phonemes (remember them?) needed for human speech. With this method, the parts of speech are already programmed into the speech chip. All we have to do is tell the chip to play them back in the proper order.

Here, as little as five bytes of memory can produce more than one second of phoneme speech. And today's computerized phoneme speech usually sounds quite understandable. However, it's a somewhat mechanical sound, not nearly as natural as sampled speech.

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TALKING TYPEWRITER

continued from page 19

3.59 MHz were satisfactory, so don't be afraid to try one. You might want to use a crystal socket so you can put in the preferred 3.12 MHz crystal later.

AMPLIFIERS: 8-BIT & ST

The SPO256 chip does much of the work, but it does not amplify sound to audible levels. Depending on which computer model you own, there are several amplification possibilities.These various approaches are discussed below.

With *any* Atari computer, you could run an audio cable with an appropriate connector to the input of your stereo. Or you might use a little one-watt amplifier (or kit) available at many electronics stores. Radio Shack does not currently carry these mini-amplifiers.

8-Bit Owners: We had very good results with an 800XL by simply plugging into the audio input of the serial port.

Optional Amplifier (Required by ST)

Figure 2

But we experienced a low volume problem on an 800. If you have the same problem, you might replace the 33K ohm resistor in the circuit with a 50K ohm potentiometer.

ST Owners: The ST version *requires* an audio amplifier. You could build the one in *Figure 2* and power it from its own five-volt supply. If you own an 8-bit computer, you might modify a serial cable as described in the paragraphs below and use the 8-bit machine as your amplifier.

8-BIT INTERFACE

Figure 1 shows how the audio signal from the circuit is routed into the computer through the serial port. If you have access to a spare serial connector (from a "daisy chain" cable connecting to your disk drive or modem), you could build a separate audio cable which can be plugged from the circuit board into the end of your daisy chain of peripherals.

If you do not have a spare connector, *Figure 3* shows how you can make one of your daisy chain cables serve double duty. Remove the screw that holds the hood onto the end of any one of your serial cables and use a small screwdriver to pop out the two appropriate pins (6 and 11) by pressing down on the little retaining tabs. Pin 6 is the ground, pin 11 is audio-in. With a low-wattage soldering iron and a very small bit of solder, connect your audio cables to these two pins and then re-insert them. If you are unsure of your soldering skills, get an experienced person to do this.

continued on page 23

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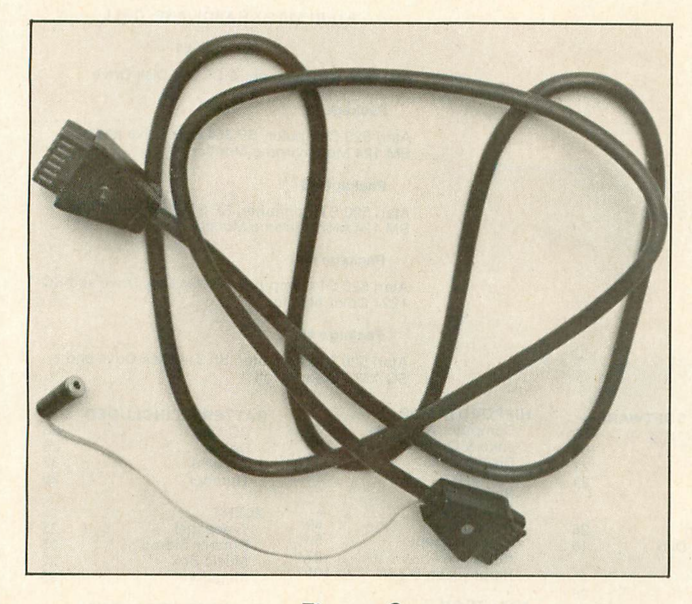


Figure 3

The address lines are connected to the joystick ports via two female DB-9 connectors. Here's a snag: If you own an XL model, you'll probably need to bend back one corner of each connector to make them fit snugly into the computer. With an XE, you have a bigger problem—the two ports are recessed so far into the computer that standard connectors will not work.

Our solution was to buy two Joystick Extender Cables available at Radio Shack. Regular joystick cables won't work because they don't have a connection to the +5V (five volts) pin needed to power the project. Anyone with a better solution is invited to send it to the **Antic** I/O Board

ST INTERFACE

For the ST hookup to the speech circuit—as shown in *Figure 4*—you will need a male DB-25 connector and a female DB-9 connector. The five volts needed to power the circuit are taken from the joystick port and, as with the XE computers, you'll need some sort of extender to fit the connector into the recessed port. The extender from a "key" that comes with PaperClip (8-bit word processor from Batteries Included) will work, providing you can remove it from the key without damaging it. Or try the Radio Shack Joystick Extender Cables we suggested in the previous paragraph.

Other than the specific changes described, the 8-bit and ST speech circuit is the same.

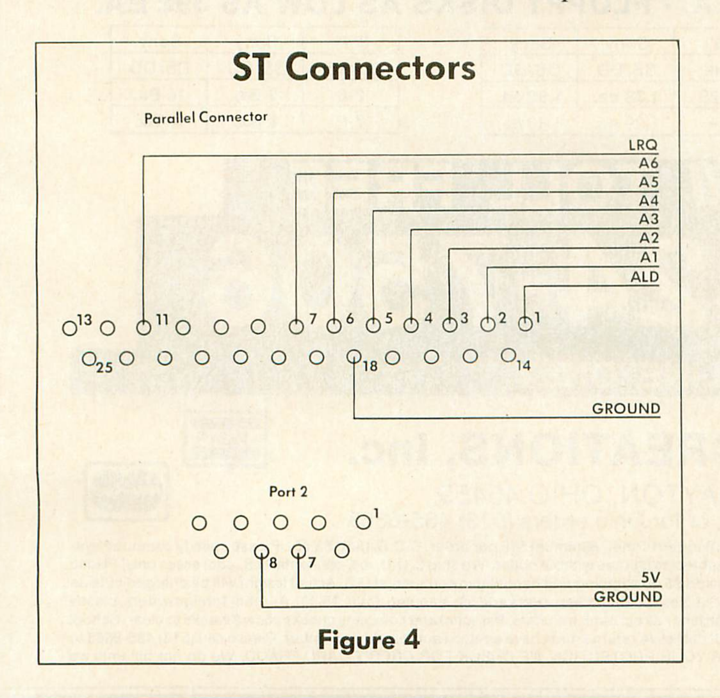


Figure 4

NEXT. . . ENTIRE WORDS

Advanced experimenters could carry this project even further by using Radio Shack's companion chip, the CTS256A-AL2, which is a text-to-speech controller. With this chip—and the more complex circuit board diagrammed in the CTS256A-AL2 documentation—users can send out straight ASCII text and have the chip's built-in ROM programming decide how to pronounce entire words.

In other words, if you type in the word "Atari," the CTS256A-AL2 will pronounce the word recognizably. There is no additional POKEing or programming involved. We're considering building this hardware project for a future article, if there is sufficient interest from readers.

PARTS LIST

The following list gives standard Radio Shack part numbers and prices. Comparable parts from any source can be substituted. The parts required for this circuit are quite common and should be obtainable without difficulty from most large electronics stores.

Part	Description	Radio Shack #	Price
C1,C2	47pF *	272-121	0.39
C3	1uF	272-996	0.79
C4	.022uF	272-1066	0.69
C5	.1uF	272-1069	0.79
R1	33K * *	271-1341	0.39
R2	100K	271-1347	0.39
XTAL	3.579 MHz * * *	272-1310	1.69
U1	SPO256-AL2	276-1784	12.95
D1	1N914	276-1122	0.99
P1,P2	DB-9 female	276-1536	2.49

You'll also need the appropriate cables and connectors based on what version you build. Use the diagram in this article—or the diagram included with the chip—to determine the parts needed for building a separate amplifier if you're going that route.

* Preferred is 22pF, not available from Radio Shack. 47pF worked satisfactorily in our version.

* * If you have insufficient volume from your TV speaker substitute a 50K potentiometer.

* * * Preferred is 3.12 MHz, available from Radio Shack on special order. 3.579 MHz worked satisfactorily in our version.

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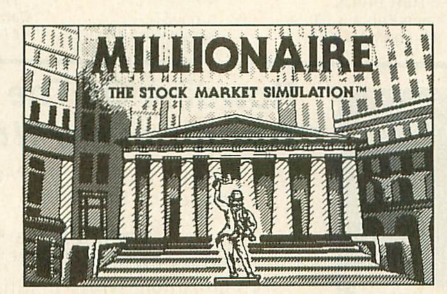
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CIRCLE 063 ON READER SERVICE CARD

Door Prize

Automated raffle picks

BY BILL MARQUARDT, ANTIC TECHNICAL ASSISTANT



Winning raffle numbers are picked and displayed by the Door Prize program. It's "just the ticket" for Atari users group meetings which hold monthly raffles. There's even an optional speech listing that announces the winners, when used with the Talking Typewriter *speech circuit described in this issue. The BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.*

Door Prize automatically picks a random four-digit number and places it on your video screen in an eye-catching display. I was struck by the need for this kind of program because I regularly attend various Atari users group meetings that hold monthly raffles.

At one such meeting a member hurriedly typed in a BASIC program to generate random numbers, which finally worked after a few crashes. More often, someone would simply write out duplicate tickets and draw the winning numbers from a box—accompanied by typical good-natured audience comments casting doubt on the integrity of the person doing the drawing. User group meetings usually set up several computers with monitors facing the group, so why not use the Atari to do one of the things it does best?

And if you build the *Talking Typewriter* speech circuit described elsewhere in this issue, Door Prize's Listing 2 will enable your Atari to announce the winning number through the monitor or TV speaker, one digit at a time.

HOW IT WORKS

The Door Prize program is essentially a random number generator, using the built in BASIC RND function. The screen is in Graphics Mode 3+16 (ANTIC Mode 8). A small change in the display list allows two sizes of text to be displayed on what would normally be a graphics only screen. This minor miracle is accomplished in lines 320-336. Line 340 calculates the starting address of the screen display and sets the value in W. Next, we display the title. Lines 350-369 will read the three strings contained in the DATA statements at lines 366-369 and

continued on next page

POKE the correct screen byte values into screen memory.

Player/Missile graphics are used for displaying the winning number large enough to be seen at a distance. To do this, we must first copy your Atari's built-in character set into Player/Missile memory. Every character in the Atari character set is defined by a series of eight bytes. Line 800 finds the starting address of the character table and adds 128 to this value. The resulting address contains the first byte of the first number in the character set—zero (0).

Each successive character starts eight bytes higher than the last. Once we know which digit we want to display, all we have to do is calculate that digit's position in the character set and copy each of its eight bytes into the Player/Missile memory. Along the way, we subtract each value from 255 to display the digit in inverse video. This technique is demonstrated in lines 403-421.

For more detailed understanding of all these procedures, read *Atari Graphics and Arcade Game Design* a 478-page book by Jeffrey Stanton with Dan Pinal. ($12.95, The Catalog, MG0103.)

When the program is RUN, you are asked for the lowest and highest possible winning ticket numbers. Any number between 0 and 9999 is acceptable for either entry—as long as the high number is higher than the low number. Door Prize will then continue to generate random winning numbers every time you press a key on the Atari keyboard or the joystick button. The program has been optimized for speed by eliminating the possibility of choosing random numbers that are out of range.

Because of the varied rules for raffles, I chose not to check for repeated winning numbers. Unless you are running a drawing with very few entrants, this should not be a problem. The program could be easily modified to add this feature by DIMensioning an array to hold the maximum number of draws, filling the array with an impossible number such as -1, and then checking the chosen random number against each element of the array before it is accepted as the winning number. Once chosen, the number would be placed into the array. Use an index variable to point to the next "open" array element.

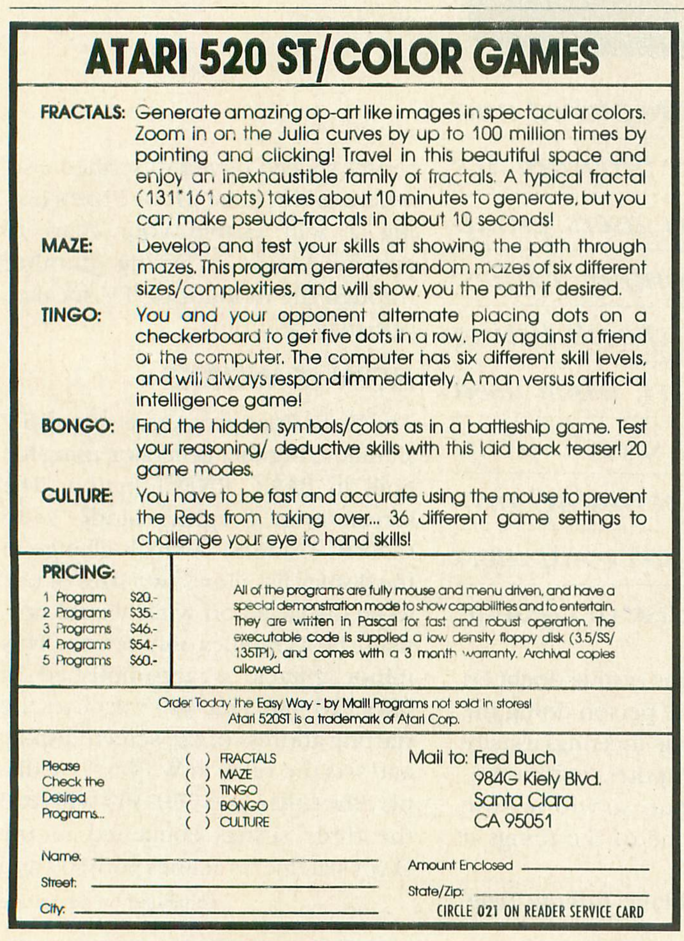
Other variations of this program come to mind, particularly if you add the speech module. How about an audible dice thrower?

TYPING IT IN

To use Door Prize, type in Listing 1, DOORPRIZ.BAS, check it with TYPO II and SAVE a copy before you RUN it.

If you want to add the speech programming lines that work with this issue's *Talking Typewriter* speech circuit project, type in Listing 2 and check it with TYPO II. LIST a copy to disk or cassette. Next, LOAD Listing 1 and then ENTER Listing 2. Remember to SAVE the combined program before you RUN it. Antic Disk owners will find the talking version of the program on the monthly disk under the filename DOORPRIZ.TLK.

Listing on page 106 





ATARI TALKING TYPEWRITER

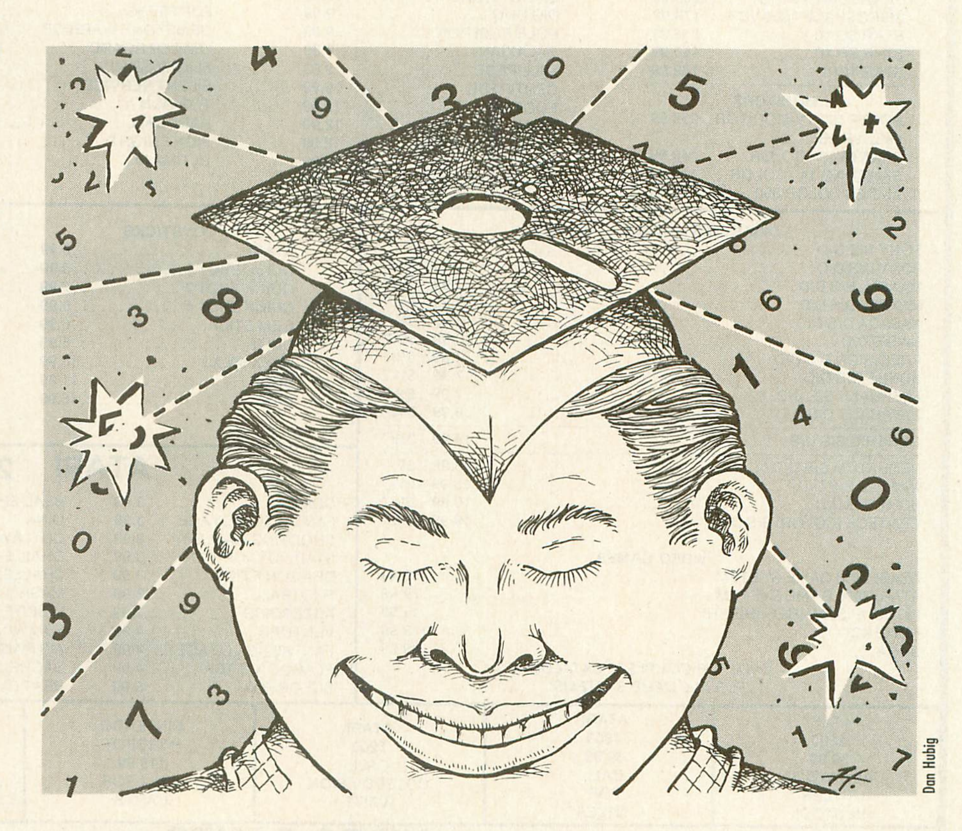
Math Attack

Learn arithmetic in a flash

BY RALPH DAVIS

As a father of four, I have reason to believe that children need more educational software to help them study basic subjects. This is why I wrote Math Attack.

The BASIC program is designed to teach general addition, subtraction, multiplication and division. It's useful for all ages because you can control the size of the factors—such as the divisor and quotient in division. You can also control the time taken by the computer to display the correct answer.



Math Attack helps students of any age learn to add, subtract, multiply and divide. It offers a choice of flash cards or a self-grading test. The BASIC program works with all Atari 8-bit computers having at least 48K, disk or cassette. You can even add an optional speech listing that announces the numbers, when used with the Talking Typewriter *speech circuit described in this issue.*

USING THE PROGRAM

Type in Listing 1, MATH.BAS, check it with TYPO II and SAVE a copy before you RUN it.

(If you want to add the speech programming lines that work with this issue's Talking Typewriter *speech circuit project, type in Listing 2 and check it with TYPO II. LIST a copy to disk or cassette. Next, LOAD Listing 1 and then ENTER Listing 2. Remember to SAVE the combined program before you RUN it. Antic Disk owners will find the talking version of the program on the monthly disk under the filename MATH.TLK.* —ANTIC ED)

Math Attack will prompt you to select the type of arithmetic you want to work with—addition, subtraction, multiplication, or integer division. Now you are prompted to type in the range of the top factor, then the range of the lower factor. The computer will

continued on next page

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randomly select numbers within those ranges. Math Attack won't accept fractions, but negative numbers are allowed. Other than that, you can use just about any range of numbers you want.

Next you'll choose a delay factor before the computer displays the answer. You may choose delays between 1 (shortest delay) to 10 (longest). Now you can pick either flash cards or a test. If you choose flash cards, the computer places arithmetic problems on the screen and you try to guess the answer before the computer shows it to you.

Press the [OPTION] key to exit to a menu with the following choices:

1. Select New Range of Numbers
2. Change the Reply Time
3. Get New Math
4. Take a Test

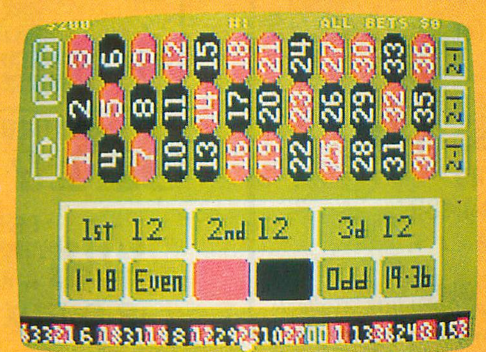
If your choice is 4, you'll be given 10 problems using the previously selected range of numbers and delay time. When you're done, the computer will grade you and display a message based on your score. Comments range from "Better Study" to "Great!" But these can be changed to anything you want. Just substitute your own messages for those currently in lines 690-770.

Also, before beginning the test, you'll be prompted to press the [SELECT] key to switch the timer on or off. This lets you opt for just figuring out the right answer without needing to type it in right away.

Ralph Davis owns a furniture store in Tallahassee, Florida, and is the vice president of the Atari users group there.

Listing on page 103

Disk Bonus Roulette



As a bonus on this month's Antic Disk, you'll find a speedy and colorful machine language Roulette game. The 8-bit program is called ROULETTE.EXE and was written by **Antic** Technical Assistant Bill Marquardt, the author of *Talking Typewriter* and *Door Prize* in this issue. Playing instructions can be found in the monthly disk's Help File.

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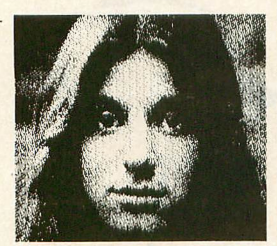
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Help
STAccount provides you with on screen help through the use of TEDDY, a screen icon. If you become uncertain of your actions during the course of running the program, just click the left mouse button on TEDDY and a help screen for that particular section of the system will appear.

Report Generator
STAccounts Report Generator is a powerful tool integrated into the system. It will allow you to reconfigure reports using any of the system information. Provided with the system are a number of default reports which can be altered, amended, or entirely reconfigured for your individual company's needs, or create new reports as to your company requirements.

SYSTEM CONFIGURATION

STAccounts is designed to be used with either a 520 ST or 1040 ST, 0.5 or 1.0 megabyte drive with monochrome or colour monitor.

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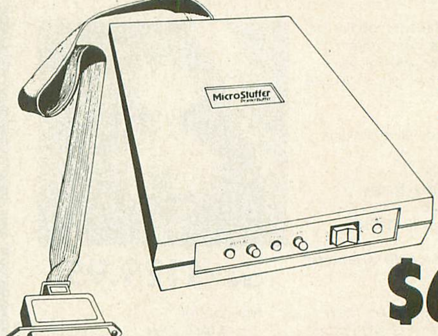
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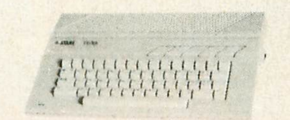
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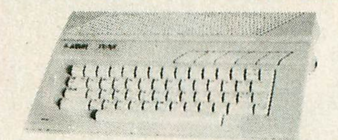
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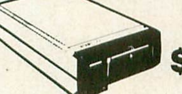
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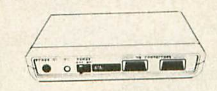
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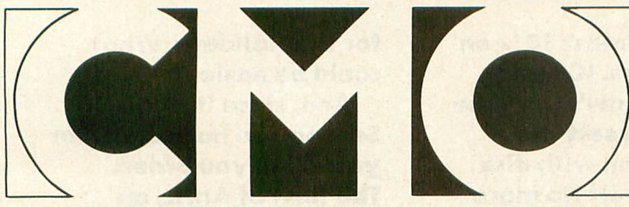
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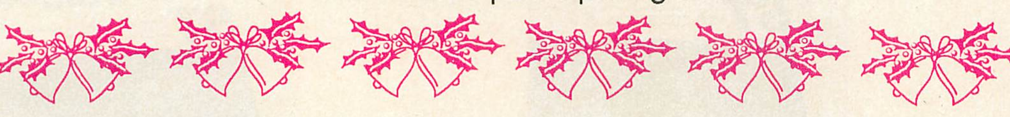
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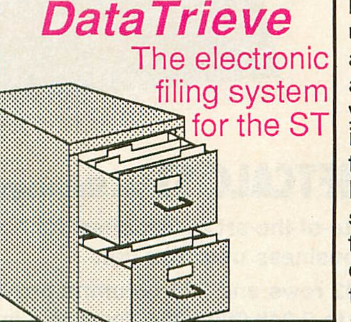
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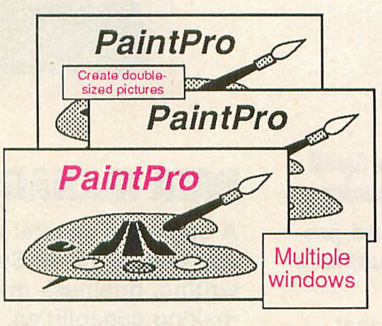
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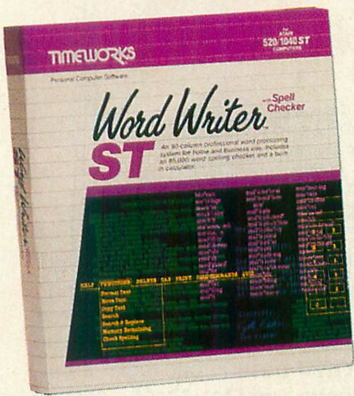
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Atari Fairs '87

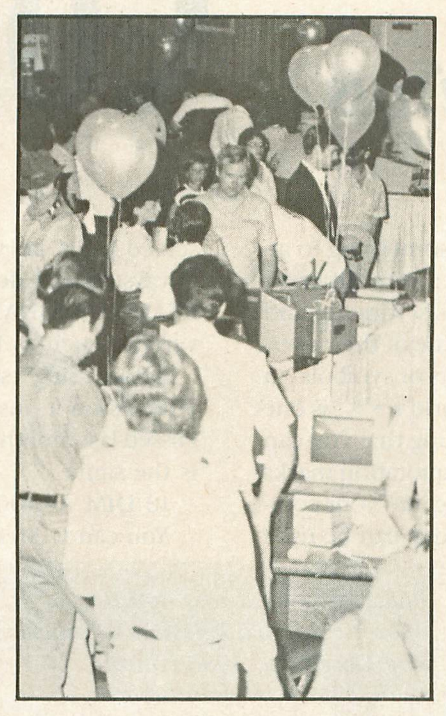
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Audiences were large and enthusiastic at the pioneering Atari Fairs held during 1986. And in the coming year, Atarians all over the country will get a chance to see the latest in Atari products and meet leading Atari professionals at fairs in their areas.

The Atari Fairs are a new grassroots phenomenon in which the Atari Corporation works closely with local Atari users groups to organize and promote the shows. Featured in seminars and panel discussions at the the fairs are top Atari spokespersons as well as representatives of major third-party companies.

The very first Atari Fair was held in Los Angeles at the Glendale Civic Auditorium, August 16-17, 1986. The follow-up was at the San Jose Convention Center September 20-21. **Antic** had a busy booth at both of these shows, which were highly successful and drew audiences of close to 5,000 apiece. Atari co-hosted the shows with committees representing the users groups of Southern and Northern California.

Closing out the 1986 Atari Fair season was an October 11-12 show at the Portland, Oregon, Coliseum hosted by PACS, the Portland Atari Computer Society and the November 22-23 PACE (Pittsburgh Atari Computer Enthusiasts) show at the Lawrence Convention Center. This Pittsburgh, Pennsylvania show was the first Atari Fair in the eastern U.S.



FULL 1987 SCHEDULE

After a holiday break, there will be at least one Atari Fair every month in 1987, starting in Colorado on February 21-22 at the Denver Regency Hotel. Abe's ACEs will host an Atari Fair at the Allentown, Pennsylvania Holiday Inn, March 13-15.

April sees Atari Fairs in Buffalo and Salt Lake City on successive weekends. The Western New York Atari Users Group will host a Buffalo fair from April 4-6 and Salt Lake City ACE will do the honors in Utah, April 10-11.

DAL-ACE hosts an Atari Fair at Dallas Infomart May 8-10. And Seattle's five local user groups welcome Atarians to Washington state on the following weekend, May 15-17 at Seattle Center Flag Pavilion.

August 29-30 takes Atari to Detroit, where MACE, the Michigan Atari Computer Enthusiasts, will host a fair at Southfield Civic Center.

MORE TO COME

New York City, Boston, Chicago, St. Louis and metropolitan New Jersey will also be sites of major regional Atari Fairs during 1987. Specific dates and locations were not yet finalized as we went to press.

The local sponsoring groups are: New York City, AGONY, Fordham University Atari User Group; St. Louis ACE; Boston Computer Society's Atari User Group; several Chicago-area groups including SCAT and LCACE; and the Jersey Atari Computer Society, Clementon, New Jersey.

To further spotlight the contributions of Atari users groups, **Antic** will publish a profile of our "Users Group of the Month" in each issue starting with February.

BY DAVID PLOTKIN, ANTIC CONTRIBUTING EDITOR

This series started in the March, 1986 issue and teaches beginners how to program in BASIC on all Atari 8-bit computers such as the 800XL and the 130XE.

New Owners Column

Lesson 10: Strings

While most of us see a string as something to attach to a kite, your Atari takes a very different view. This month we'll discuss setting up and manipulating **strings**, also some of their uses.

A string can be a series of letters, numbers or symbols—a string of characters. "* * *Hello there world* * *" is one example of a string. In fact, almost anything that you can type into your computer and enclose in quotation marks ("") can be a string. When you type a string into your computer, it is called a **string constant**, and it can be used in many ways, such as PRINT statements:

10 PRINT "* * *HELLO THERE WORLD* * *"

You've seen many examples of string constants in previous New Owner's Columns. But string constants are not where the real power of strings lie.

STRING VARIABLES

The real power lies in **string variables**. As the name implies, the contents of the string can be varied, so custom strings can be built from within the program. The first step to using string variables is to declare them. String variable names can be almost any length, but you can't use reserved BASIC keywords for variable names. And they must always have a dollar sign at the end: A$, RULE$, and REALLYLONGNAME$ are all valid string variables. A string variable such as B$ is read as "B-string".

Before using a string variable in your program, you must DIMension it, just as with the subscripted variables discussed last month in the December, 1986 **Antic**. The form is the same:

10 DIM A$(100),RULE$(10)

You can DIMension subscripted variables in the same DIM statement with string variables. The number in parenthesis following the string variable name is the maximum length of the variable. In this case, Attempting to put more than 100 characters in A$ generates an error.

After your string variables are DIMensioned, they can be used in various ways. One way to put information into a string is to use the INPUT statement:

10 DIM A$(20)

20 PRINT "WHAT IS YOUR NAME":INPUT A$

30 PRINT "YOUR NAME IS ";A$

This short program asks for your name. When you type your name on the keyboard, the information is put into A$. Note that if you type in a

Please note that last month's column skipped a lesson number. The December, 1986 column should have been numbered Lesson 8 instead of Lesson 9. The mistake arose during production of the issue, due to confusion over whether The Great GOTO Debate *(October, 1986) was a New Owners Lesson or not. (It wasn't!) In hopes of minimizing further confusion, we'll call the column in this issue Lesson 10 and continue on from there. Please be assured that no lessons have been left out of this popular series.—* ANTIC ED

name longer than 20 characters (the DIMensioned length of the string), only the first 20 characters will be stored in A$. The rest will be lost. Try it and see.

Another way to put information into a string is with READ/DATA statements. DATA statements may contain strings which can be READ:

```
10 DIM NAME$(20)
20 READ NAME$:PRINT NAME$
30 DATA DAVID PLOTKIN
```

This program reads the DATA in line 30 into NAME$. Note that your Atari will read DAVID PLOTKIN as just one item of DATA, while DAVID, PLOTKIN would be two DATA items because of separating comma (,).

LEN STATEMENTS

After information is stored in a string, you can manipulate that information within the string and also transfer it to other strings. The first thing you'll normally need to know about a string is the current length, which is given by the **LEN** statement:

```
100 A=LEN(NAME$)
```

LEN does not give the maximum length of the string as stated in the DIM statement, but rather *the number of characters currently in the string*. For example, if you DIMension NAME$ to 20, and the user only INPUTs "DAVID", then the length of the string as returned by LEN is 5. If no information has yet been entered into the string, then LEN will return a length of 0. We'll see shortly why LEN is so important.

The simplest way to move information either inside a string or between strings is to set two strings equal:

```
10 DIM A$(20),B$(30)
20 A$="HELLO THERE READER"
30 B$=A$:PRINT B$
```

The contents of A$, as set up in line 20, are entered into B$ by line 30. Note that A$ still contains its original contents, so the two strings are now equal, just as you'd expect.

SUBSTRINGS AND SUBSCRIPTS

The other way to move information around is with portions of strings, called **substrings**. To access a substring, you specify which element(s) of the string you want:

```
10 DIM A$(20),B$(30):A$="HELLO THERE READER"
20 B$=A$(1,5):PRINT B$
```

Line 20's two numbers in parenthesis (1,5) are called **subscripts**. The first represents the starting point of the string and the second is the ending point. In this example, B$ is equal to the elements 1-5 of A$. If no second subscript is supplied, then the substring is considered to go from the first (only) subscript to the end of the string. If the subscript is 1, this effectively sets the two strings equal. You can equate substrings of both strings:

```
40 B$(3,5)=A$(6,8):PRINT B$(3,5)
```

As shown above, you can PRINT substrings. Note that strange results may occur if the length of the two equated substrings are not equal. Whichever substring is smaller will govern the amount of information transferred:

```
40 B$(1,10)=A$(2,2)
```

The above line puts the character in position 2 of A$ into position 1 in B$, but the rest of B$ is not affected.

You can use the substring techniques to make strings longer. This is where the LEN function is important. Since LEN returns the current length of the string, you may use it to ensure that new strings and substrings are added to the end of the current string. For example, consider a program that requires the user to input a file name to be read from disk. As you know, disk file names must be preceded by "D:" or "Dn:" where n is a digit from 1 to 8. But what if the user forgets the "D:"? The example builds a new string from the filename, adding "D:" if it is absent:

A string can be almost anything you could enclose in quotation marks

```
10 DIM FILENAME$(16),NAME$(16)
20 PRINT "WHAT FILE NAME":INPUT NAME$
30 IF NAME$="" THEN GOTO 20:REM JUST IN CASE THE USER JUST HITS [RETURN]
40 IF NAME$(1,1)="D" AND NAME$(2,2)=":" OR NAME$(3,3)=":" THEN FILENAME$=NAME$:GOTO 100
50 REM TEST FOR "Dn:" OR "D:".SKIP OVER THE REST IF IT IS PRESENT
60 FILENAME$(1,2)="D:":FILENAME$(LEN(FILENAME$+1))=NAME$
100 PRINT FILENAME$
```

In line 60, we build the string we will need. Note that the use of the LEN function tells us how long our string FILENAME$ is. By building our substring starting at *one more* than the current length of the string, we can tack on information without disturbing what's already there. Note that in this example, we actually knew how long FILENAME$ was, but there will be times when we won't know. Notice line 30 also: if NAME$ is empty, the statement NAME$="" (two quotation marks with *no* spaces between) is true. You can erase all the information in a string by using this same form of statement:

```
30 NAME$="":REM clears the string.
```

CONVERTING STRINGS

The function **VAL** converts strings to numbers, and **STR$** converts numbers to strings. VAL works by changing any numbers contained in a string to their numeric value:

```
30 N=VAL(A$)
```

If the first character of the string contained in the VAL statement is a letter, you'll get an error. VAL stops at the first non-numeric character, ignoring the rest of the string. VAL can be used on a substring or a string constant.

STR$ is useful if you need to put a number into a part

of a string:

10 DIM A$:N=123:A$(1,5)= "AAAAB":A$(6)= STR$(N) Puts "123" into positions 6-8 of A$.

COMPARING STRINGS

Two or more strings are equal when they are identical. What could be simpler? Thus if A$="AAA" and B$="AAA" then the statement "A$=B$" is true. But the concept of strings having comparative value needs some explanation. Each character in a string is represented by a value in your computer called the ATASCII value. (ATASCII will be the subject of next month's column). For example, the ATASCII code for the letter A is 65. You'll find a table of these codes in the back of your manual.

Contents of strings vary, so custom strings can be built from within programs

Owners Column program yet. If you have ever wanted to play the stock market without endangering your life savings, here's your chance. This program also demonstrates the use of strings. Instructions follow. I've made quite a bit in this stock market—and also lost my shirt.

To enter the market, type in Listing 1, NEWOWN9.BAS, check it with TYPO II and SAVE a co[illegible]

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NX-10 219

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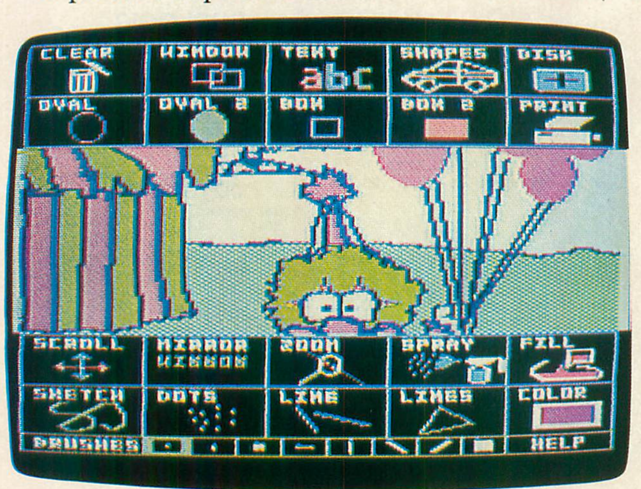
CIRCLE 040 ON READER SERVICE CARD

BLAZING PADDLES

Baudville
1001 Medical Park Drive S.E.
Grand Rapids, MI 49506
(616) 957-3036
$34.95, 48K disk
CIRCLE **268** ON READER SERVICE CARD

Reviewed by Charles Jackson

Blazing Paddles, a popular drawing program for the Apple II, is now available for your Atari. It uses Graphics 7 1/2 (ANTIC Mode E), to create four-color medium resolution picture files that are compatible with Micro-Painter. Overall, I found this software enjoyable to use and powerful enough to produce impressive results.



Blazing Paddles uses a friendly icon-driven menu similar to those used by KoalaPad and Atari Touch Tablet software. However, Blazing Paddles has quite a few more features than either of these packages—such as multiple text modes.

With Blazing Paddles, you can add titles and captions to your images. The program supports normal text (a la Graphics 0), double-width text (Graphics 1) and double-width, double-height text (Graphics 2). The letters may be drawn in uppercase or lowercase, in any of the four available colors, or in any pattern. You can also use any of your own custom character sets.

For detailed work, the Blazing Paddles Zoom function is one of the easiest to learn and use. This function divides the screen into two horizontal windows. The top window shows your unmagnified picture along with a movable 10×16 pixel frame. The frame's contents fill the bottom half of the screen. Here, you may edit your picture a pixel at a time.

Computer artists wishing to "soften" the lines of their pictures will appreciate the random Spray Paint function. This option turns your brush into a spray can, shooting a fine, randomly-textured mist of electronic "paint" over your picture.

Despite the software's name, you may draw with either a joystick, a KoalaPad, or a set of paddle controllers. However, Blazing Paddles will *not* work with the Atari Touch Tablet. We were also unable to use any of our light pens with this software, despite the package's claims that light pens are supported. We contacted Baudville's programmers, but did not receive a response as this issue went to press.

Blazing Paddles comes on a double-sided disk with the Commodore 64 version on one side. The 24-page manual is specific to the Commodore version, but Baudville also includes a six-page insert describing the differences in the Atari version. If you never used a drawing program before, you should read both sets of instructions.

Blazing Paddles still has a few rough edges, though. For example, you must go to a separate menu screen to change pen colors, and all your picture filenames *must* have a .PIC extender.

If you have pictures created with other drawing programs, you can use the *Rapid Graphics Converter* (**Antic**, November 1985) to convert your pictures into the proper format. In this case, you should convert your picture into Micro-Painter format, and make sure to give it a filename that ends with .PIC.

GRAPHIX AT

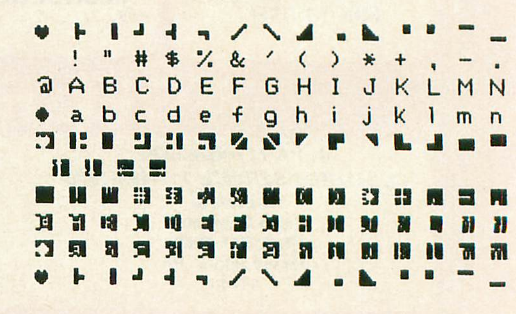
Xetec Inc.
2804 Arnold Road
Salina, KS 67401
(913) 827-0685
$69.95
CIRCLE **259** ON READER SERVICE CARD

Reviewed by Kevin Peck

Graphix AT, the first Atari release from a company known mainly for Commodore products, is a "smart" interface box that enables your printer to produce hard copies of Atari special characters—even inverse—exactly as they appear on screen.

Now you don't have to LIST programs to disk, LOAD and RUN special lister software, wait for the printout, then LOAD your original program and start debugging with printout in hand. Instead, you just type LIST "P:" right from BASIC. The printout is faster than any of my lister programs, because the Graphix AT has its own microprocessor with supporting ROM that contains the Atari character set in printer format.

Printing Atari characters requires converting screen characters to printer characters. Most lister programs do this while each character is sent to the printer. The Graphix AT uses the printer's graphics mode. But the 6502



in the Atari doesn't do a screen-to-printer character conversion. Therefore the computer can send the listed program to the printer at full speed. The interface sends regular characters straight through, and special symbols take up less than 10% of the average printout.

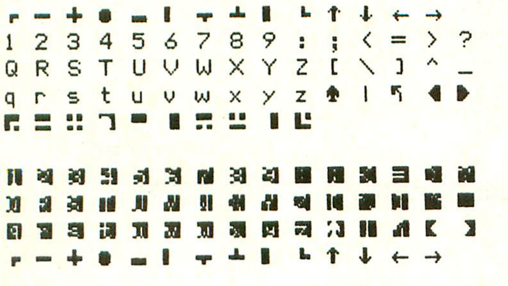
The Graphix AT is great for fast draft-quality listings, but if you want well-defined characters, you'll have to keep using your software listers. The AT's only listing mode is draft quality. Normal alphanumeric characters are given slightly different shapes in inverse video. Inverse lower-case letters lack descenders.

The interface won't print the [ESC] character—because [ESC] is used with a second key to control some options while in the Graphix mode. Granted, the [ESC] symbol rarely shows up in program listings, but when it does, you want it in the printout, and you'll need your lister programs for that.

But I'm not complaining too loudly. The print speed is well worth the slightly less readable output and the possibility of missing [ESC] characters.

Graphix AT's Transparent mode sends special characters straight through to the printer. Use it with your word processor, Print Shop, your lister program or any other program that expects a "normal" printer interface attached to your printer.

1200XL owners can use the Graphix AT, but will have to cut a wire and solder a trace. You'll need a printer that supplies 5 volts at 50mA on pin 18 to power the interface. This power output is standard for Centronics parallel connectors on printers.



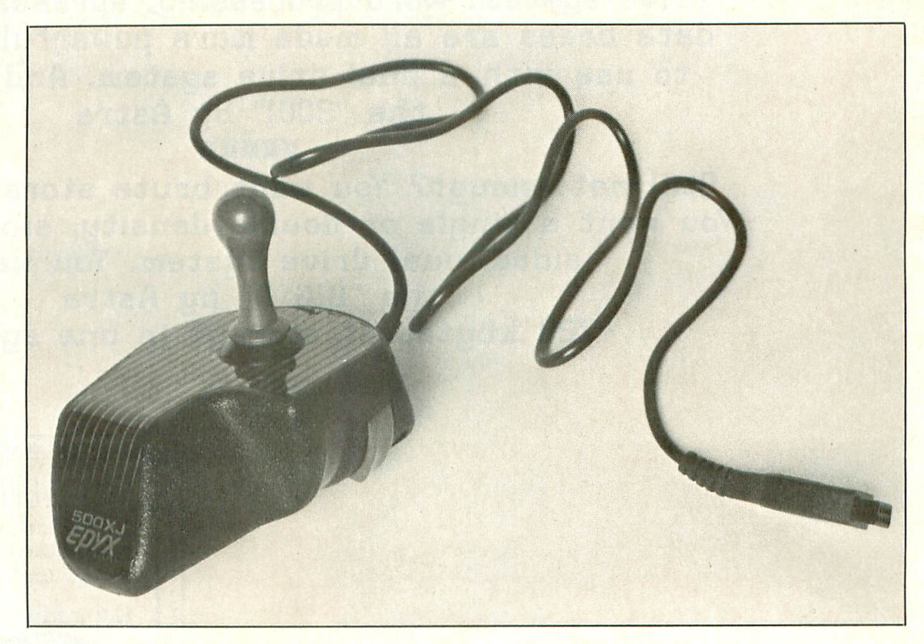
I would recommend the Graphix AT interface for programmers and non-programmers alike, even with the small problems mentioned. The handy listing feature is hard to live without after you're used to it. The interface is competitively priced and compatible with all the software I tested.

500XJ JOYSTICK

Epyx Inc.
600 Galveston Drive
Redwood City, CA 94063
(415) 366-0606
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CIRCLE **262** ON READER SERVICE CARD

Reviewed by Gregg Pearlman



The **Epyx 500XJ** joystick seems like the first joystick actually designed to fit into the hand that holds it. Specifically, the 500XJ is designed for left hands. Your left index finger rests comfortably on the fire button. Your left thumb and middle finger fit into grooves while the other fingers wrap naturally around the base. The right hand has nothing to do except move the stick.

When you move the stick, switches click to let you know you've done so. The shaft is molded around solid steel. The fire button, which clicks when pressed, is perfectly angled for your trigger finger. In short, the Epyx 500XJ is an unusual, ergononic and efficient product. And it even comes with a five-year, 10 million-shot warranty.

We at **Antic** were eager to try out the 500XJ and, by and large, we've all enjoyed it. It does seem to respond better than our other joysticks (most of which, however, have been beaten to a pulp while working on programs and reviews).

However, if you're the type who likes to leave the joystick on the table and keep one hand free, forget it. You must hold the 500XJ. Also, not everyone is right-handed—and the 500XJ is not particularly comfortable for lefties who wish to hold the unit in their right hands while working the stick with their left hands.

But the 500XJ is generally a good product—for right-handers, at least. The sturdiness and comfortable fit are definitely impressive, and the warranty is hard to beat.

continued on page 48

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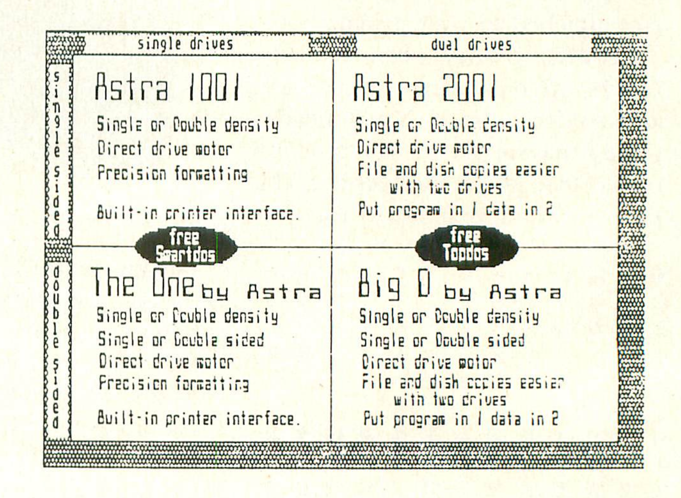
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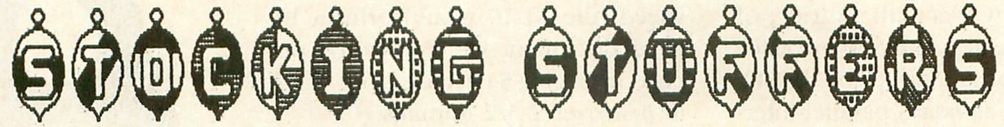
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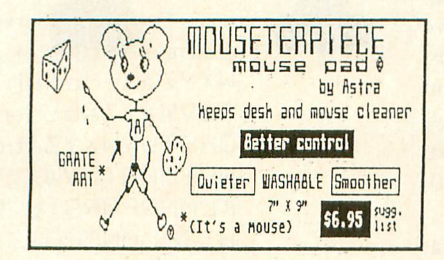
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CIRCLE 010 ON READER SERVICE CARD

REVIEWED BY GREGG PEARLMAN

STAR NL-10 Printer

Affordable dot-matrix powerhouse

The **NL-10** from Star Micronics is a 9-pin dot-matrix printer that features outstanding near letter-quality, producing even smoother characters than its popular predecessor, the Star SG-10.

The sleek, standard-size NL-10 also delivers conveniently versatile operation, with panel buttons replacing DIP switches for hardware control of some often-used settings such as pica, elite, condensed, boldface and NLQ. Naturally, these styles can also be controlled from within a program or a printer configuration file instead of directly from the panel buttons. Tractor and friction feed settings are built-in, and your paper loads in effortlessly from the back.

The NL-10 works with a variety of computers via separate $60 interface cartridges. For an Atari (8-bit or ST), you need the standard parallel interface. Installation is easy and requires less than five minutes—just plug it in. Owners of Atari 8-bit computers will also need an Atari 850 interface or ICD's P:R: Connection.

Star calls their NL-10 compatible with the Epson FX-80. (Star's other current SG-10 descendant, the NX-10, is claimed compatible with the Epson FX-85.) We found our NL-10 to be smoothly Epson-compatible with all the software we tried, except for a few mysterious minor glitches with Batteries Included's PaperClip word processor.

The NL-10 proved itself to be an impressive graphics printer, as demonstrated in the accompanying picture of Tutankhamen. On the ST, no detail was lost in our high-resolution version of Tom Hudson's Bee. Graphics on the NL-10 can be printed at normal density, double density (at normal or double speed), or quadruple density.

Draft mode print quality is good and the printout is fast. In fact, in a quick test, this review was copied from disk to the printer with Atari DOS 2.5 and printed out at roughly 75 characters per second. At this speed, the NL-10 would print a 10-page document of 250 words per page, averaging 5 characters per word, in just over 2 1/2 minutes.

Unlike Star's earlier Gemini 10X and SG-10, the NL-10 uses pop-in ribbon cartridges instead of inexpensive and easily-obtained two-reel ribbons. When we checked our usual ribbon suppliers, we found that the most accessible replacement was Star's own cartridge for the NX-10 and NL-10, priced at around $10.95.

The default print setting is pica, which Star measures as 80 characters per line (cpl). Elite (96 cpl) and condensed (136 cpl) can be set by pressing the mode button on top of the printer. As with most dot-matrix printers, near letter-quality is limited to 80 characters per line. The NL-10 will print subscripts and superscripts while in NLQ mode, but it doesn't actually print them *in* NLQ.

Emphasized and boldface print characters are both double-struck, but in emphasized print, the second strike is slightly to the right of the first, while in boldface it's slightly above. The differ-

NL-10 Draft Mode

ence is subtle, but certainly visible. Emphasized boldface printing, in which each character is struck *four* times, really stands out.

Proportional spacing, expanded (double-wide) print, and even "quad" print (double-wide, double-high) can be be controlled from within a program or via the printer driver file of a word processor. Also available is a master print mode command, which lets you set any combination of print pitch, boldface or expanded print and underlining.

The two-volume documentation for the NL-10 is thorough. A 32-page users manual covers the basics such as set-up and elementary maintenance. The main 180-page volume tells how to make the printer do whatever you want it to do. There's detailed information about BASIC and ASCII codes, CHR$ functions, control and escape codes. Other chapters explain the different typefaces and print pitches, line spacing, page control, margins and tabs. The Special Features section describes how to obtain double-sized or "quad" characters, macros and defining your own characters.

Eight appendices take up nearly half of the volume. Topics covered are DIP switch settings (the DIP switches can be accessed easily on the back of the printer), ASCII codes and conversions, character fonts for standard and international characters, function codes, technical specifications, the parallel interface itself and connecting with various computers.

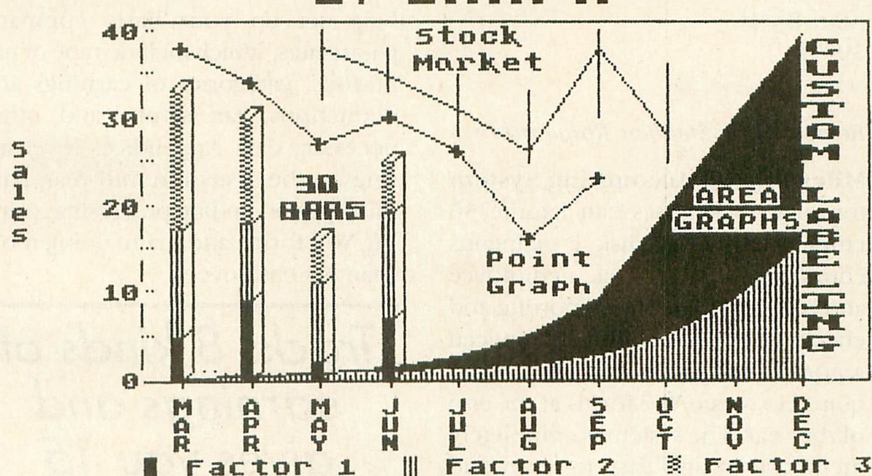
The NL-10 is not horribly loud, but it is louder than our other Star models. This is not a printer to use while someone is trying to sleep in the same room. However, at least the printer *sounds* fast.

The Star NL-10 is a fine printer and a bargain at $379 including the interface cartridge. Its near letter-quality mode leaves many other 9-pin printers in the dust and its documentation tells you everything you need to know.

Star Micronics, Inc.
200 Park Avenue
New York, NY 10166
(212) 986-6770
$319, requires $60 interface

CIRCLE **264** ON READER SERVICE CARD





EFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvw
BCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrst
89ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopq

NL-10 Near Letter-quality

B/Graph software screen from Batteries Included. King Tut from KoalaPad.

PRODUCT REVIEWS
continued from page 43

MILES PAYROLL ACCOUNTING SYSTEM

Miles Computing Inc.
21018 Osborne Street, Building 5
Canoga Park, CA 91304
(818) 341-1411
Requires 32K, two disk drives,
Atari BASIC
$99.95
CIRCLE 267 ON READER SERVICE CARD

Reviewed by Stephen Roquemore

Miles Payroll Accounting System for small businesses can handle 50 employees per data disk. It maintains cumulative totals for each employee and has comprehensive reporting and check-writing capabilities. A special report feature produces all the data required to create W-2 forms at the end of the year. The system is completely menu-driven and easy to learn and use.

(*Miles Payroll software has been available for several years, but was not actively marketed for much of the time.* ***Antic*** *never seems to have previously reviewed this product in detail.*—ANTIC ED)

Written in Atari BASIC, the Miles Payroll system should also run under BASIC XL/XE successfully. But it does *not* take advantage of the extra RAM in a 130XE or an 800XL.

Miles Payroll tracks eight kinds of earnings and includes federal, state, and city withholding taxes, FICA, SDI (for California users), group insurance and three user-defined deduction categories, one of which sets up deductions for tax-sheltered retirement plans. Miles also lets you maintain federal and state unemployment insurance, and allows 10 user-defined workman's compensation categories.

You can change federal, state and city tax data easily at year-end because the tax information is set up in tables. A thorough section in the manual leads you through this process.

The excellent manual comes in a three-ring binder containing plastic sleeves holding the Company Set-up, master and data disks. The data disk can (and should) be duplicated and put in a safe place. The other two are copy-protected. Backup disks and check-printing forms are available from Miles Computing for a nominal fee.

The manual includes a tutorial to help set up your basic company parameters, which include type of pay periods, categories of earnings and deductions, tax setups and other necessary data. Appendices cover setting up the system in mid-year, handling period-ending processing, printing W-2 forms and maintaining more than 50 employees.

Tracks 8 kinds of earnings and gives you 15 different reports

Other chapters deal with updating employee data, editing totals, entering time card data and the 15 reports available from the system. Specialized reports include group insurance, workers compensation, quarterly IRS data, pay history mailing labels, W-2 data and time card entries.

Company Set-up took a *lot* less time to do than to read about. You don't need to set up each item on the menu. If you don't use workman's compensation, for example, you can skip that section entirely.

After inventing some tax table data, I returned to the main menu and started adding employees. The clear instructions in the manual and the colorful screens made this a breeze. Changing employee data was just as easy. You're asked which item to change, then which employee to change. You're shown the current data and asked to enter the new data. Both processes let you change your mind.

"User-friendly" *really* applies to this system. When adding or changing employee data, you can input pay history information—very useful if you're setting up in mid-year. Entering transactions for the employees was also a piece of cake. Changing employee status to and from "terminated" was easy. It allows retention of employee data until completion of year-end and W-2 Form processing. You can also delete employee records from the data disk.

In the time card entry section you can enter employee hours for each earnings category activated in Company Set-up. For each salaried employee's paycheck you must manually compute an hourly pay rate in Company Set-up based on information in the manual. Salaried employees are then handled the same as hourly employees. You can also edit existing entries before recording data.

File editing was easy too. Its primary use is to add data when setting up in mid-year—you must be *very* careful to enter accurate data here or else your entire database will be compromised. You can also alter totals if they have been wrongly updated by the pay period report.

The check printing section allows for "manual" check printing, where you enter the payroll figures as prompted, with a chance to review and correct entries. Then the check is printed for you on command. A check template option is provided so you can correctly align checks in your printer. Any printer will work, since no special control codes are used.

This quality and comprehensiveness of Miles Payroll software is very impressive. I *highly* recommend this product to any small business manager who needs an excellent, easy, comprehensive payroll system. Miles Payroll, combined with a good general accounting package and a good inventory system, is all that a small business would need for proper financial management.

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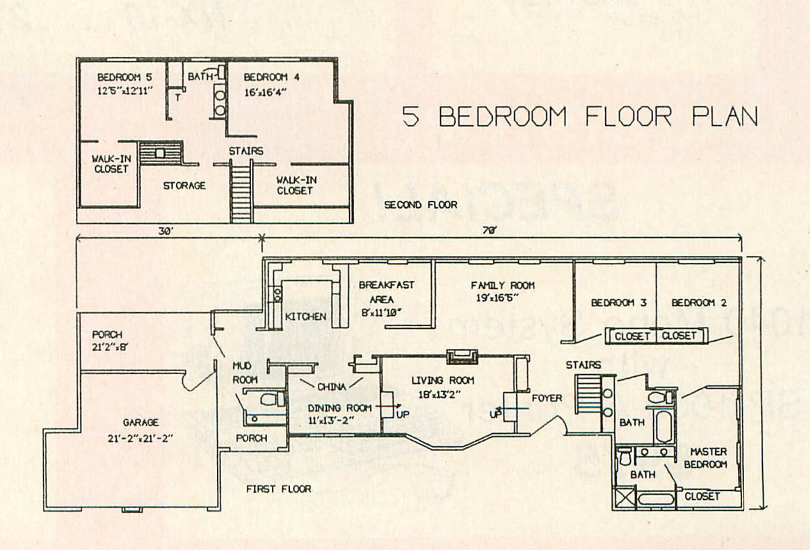
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•• THIS ENTIRE AD WAS DESIGNED WITH AND PRINTED BY THE GRAPHIC ARTIST and FONTPACK-1 USING AN HP LASERJET PRINTER. Shown ACTUAL size. ••



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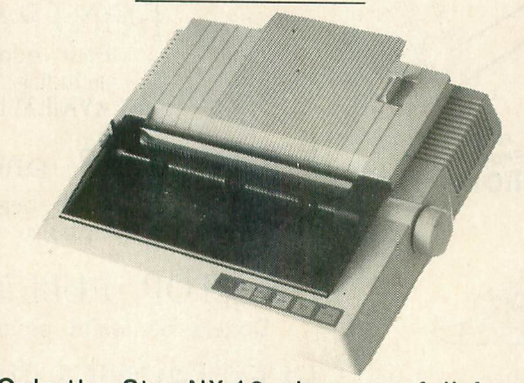
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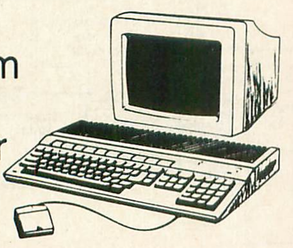
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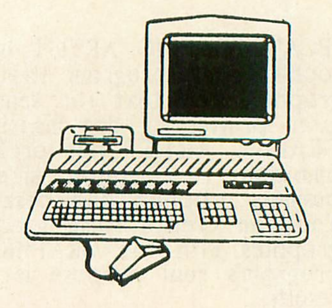
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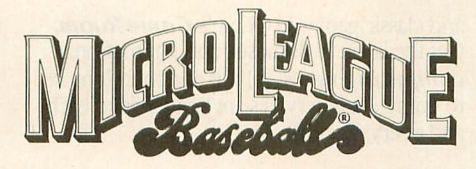
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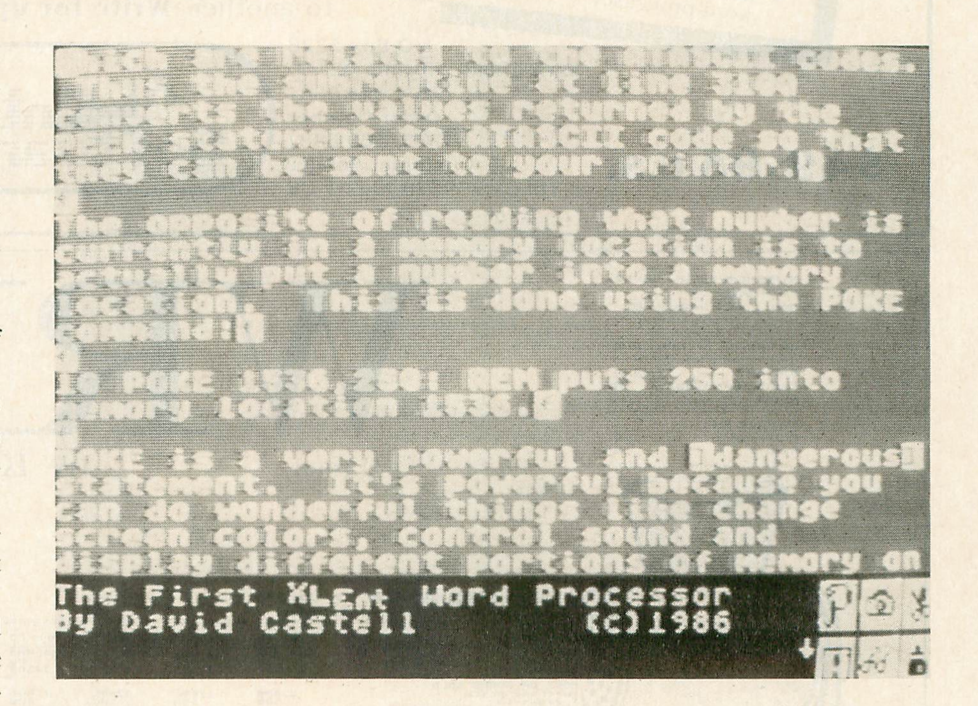
First XLEnt Word Processor

Up there with the best—and only $29.95

REVIEWED BY CHARLES CHERRY

The only thing misleading about the title of **First XLEnt Word Processor** is that it's not the first excellent word processor for the 8-bit Atari. True, this is the first word processor from XLEnt software—and it is an excellent word processing program. First XLEnt takes its place among the very best, and carries the very attractive price of $29.95.

Other top Atari word processors such as PaperClip, AtariWriter Plus and Letter Perfect offer powerful features such as advanced screen editing, cut-and-paste block moves, search-and-replace, chaining files, support for different printers, mail merge, etc. In addition, a program like Word Magic can also put pictures into the text, use the joystick for cursor movement and edit two documents at once. First XLEnt offers all of the above, plus icon commands and a whole list of uniquely civilized amenities.



Word processing is a personal thing, and it's hard to predict what a person will like or need. Here's what made me like First XLEnt so much that I now use it for all my word processing.

MANY ADVANTAGES

• Speed: The first quality of user-friendliness is speed. First XLEnt is fast. Search-and replace is almost instantaneous, even on large documents. Cursor speed is adjustable on the XL/XE machines, but it's too slow on the 800. However, you can use the joystick to move long distances, and that speed is adjustable on all machines. Things slow down in the insert mode near the beginning of a long document, of course. But First XLEnt provides a quick way to open up blank lines, use the overstrike mode, then close up the extra spaces. Very neat.

• Simple, clean text files: First XLEnt does not add any obscure codes, headers or other garbage when saving to disk. Other programs can use the files without problems. Also, First XLEnt can load anything, from any Atari DOS source.

• First XLEnt is unprotected and has a standard DOS interface: It comes with DOS 2.5, but you can substitute your own DOS (if it's not too big). This means you can use a high-speed DOS, a custom RAMdisk, etc.

continued on next page

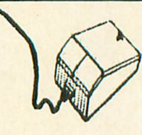
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520ST

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- Load files created with your word processor

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PRO FORMA INCOME STATEMENT - FIRST YEAR
RIGHT 90 COMPANY
January 1, 1985 to December 31, 1985

Line items:	Month: Jan-85
Gross sales	$38,000
Discounts, returns & allow.	500
Net sales	37500
COST OF GOODS SOLD	
Purchase price	22000
Freight-in	500

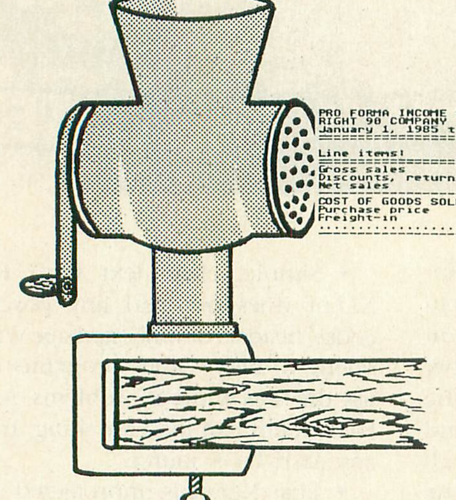
WRITE 90°

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BY KEN STAILEY


PRO FORMA INCOME STATEMENT - FIRST YEAR
RIGHT 90 COMPANY
January 1, 1985 to December 31, 1985

Line items!	Month: Jan-85	Feb-85	Mar-85	Apr-85	May-85	Jun-85
Gross sales	$38,000	$38,000	$38,000	$38,000	$38,000	$38,000
Discounts, returns & allow.	500	500	500	500	500	500
Net sales	37500	37500	37500	37500	37500	37500
COST OF GOODS SOLD						
Purchase price	22000	22000	22000	22000	22000	22000
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• Inversing the text when defining blocks: This is the only way it should be done.

• Word-wrap parsing on hyphens as well as spaces: This makes breaking words much easier. First XLEnt also has soft hyphens that are invisible unless needed for a line break, and hard spaces which prevent a line break at that space.

• A visible, editable cut-and-paste buffer.

• A true file insert: This allows you to insert a disk file anywhere in your text without losing the end of your document.

• Partial document save: You can save any portion of the document in memory to disk.

• Disk file preview (called "spool" in the First XLEnt): This handy feature lets you look at the contents of a disk file without disturbing the document in memory.

• Aligning your paper to the first printed line instead of the top of the page: At first I was suspicious, but now I think it's great.

• A software switch to toggle between line feed and carriage return: No more fumbling for the DIP switch on the printer when changing to another computer, such as an ST.

• Superb handling of margin settings: You can make your margin changes either relative or not relative to the starting margins. There is also a margin release and automatic indentation and outdentation. These are joys to use.

• Full-screen windows: When working with two documents in memory, First XLEnt flips between them instead of splitting the screen.

• One-pass double-column printing: Since some formatting commands won't work with one-pass printing, two-pass double-column printing is also available. Double-column printing will only work on XL/XE machines.

• A very good 80-column print preview: It actually uses a software-generated 80-column text to produce a readable demonstration of what your document will look like. Unfortunately, it returns you to the document in the strikeover typing mode, even if you started with the insert mode, so beware.

• Very comprehensive printing capabilities: These include conditional page breaks to overcome "widows" and "orphans" (single words left at the top or bottom of a column). Other unique features include skip text, which puts notes on the screen that will not be printed, verbatim bytes, ASCII numbers and even disk files from the middle of your text. You'll have complete access to all of a printer's features (including graphics).

XLEnt says that First XLEnt can only do graphics on Epson-compatible printers. It is true that First XLEnt handles Epsons automatically. But you can also send the codes to put your printer in graphics mode, then send a suitable picture file. Pictures can thus be produced with any printer.

FEW MINUSES

The First XLEnt Word Processor has only a couple of serious limitations. The most obvious is a maximum of one screen—800 characters or less—for each cut-and-paste buffer move. This didn't bother me too much because my writing habits don't require many large block moves. However some people will be irked by moving text in sections. The other serious limitation is that headers and footers are restricted to one line. This also is not a problem for me, but it might not be adequate for others.

Other problems are more in the nature of annoyances than serious limitations. Some stem from the icons which are used as a function menu. I know icons are hot right now, but in this application they just require more keystrokes and use up four lines which I'd rather have for text.

• The instruction manual is good until it starts talking about printing, then it gets murky.

• When you go to the icon menu, you're not always returned to the same spot in the text where you left, or, as noted above, not always even the same typing mode.

• The inverse text marking of the cut and copy functions is not used for the block delete. In fact there is no visible marking of the block delete at all.

• The screen advance command flips directly to the next screen, but the previous-screen command scrolls. It's not really that slow but it bothers me because I use it a lot.

• The [CONTROL] commands on the 800 are [OPTION] commands on the XL/XE. I wish these had been consistent, because some of us use both machines.

• The otherwise excellent print preview does not display expanded or condensed characters correctly.

• You can't save your settings of cursor speed and shape, screen contrast, typing mode, margins, tabs, word wrap, etc.

• You can't save page-formatting defaults either. This is less of a problem because you can always load a preset format line, but it would be nice if it was automatic.

• You can't search-and-replace a carriage return. You can't do this with any other word processor either. But I wish somebody would include it so we could deal with Atari's non-standard return.

As you can see, these problems aren't serious. I expect many of them to be cleaned up in future revisions. And there are lots of nice touches I did not mention above, such as a print spooler and type-ahead buffer for the 130XE. And there's good support for special printer characters, including changing daisy wheels.

Overall, First XLEnt Word Processor is great software. Although not perfect, it's as good or better than any other word processor you'll find for the 8-bit Atari. First XLEnt suits my own work-style very well. I used it to write this review and I'll use it from now on.

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*Charles Cherry is a regular **Antic** contributor and former Product Manager of The Catalog.*



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BY J. D. CASTEN

Rebound

Flip Ogart vs. the RotogartEatos

J.D. Casten's sixth **Antic** *game—his first in 13 months—is another diabolical maze chase.* Rebound *features flashy graphics, fast action and a typically demented storyline. The BASIC program works on 8-bit Ataris with at least 32K memory, disk or cassette.*

"DISASTER IN OGARTOPOLIS!" screamed the New Ogart Times front page headline.

Flip Ogart adjusted his spectacles and read closely as he bounced down the busy avenue. "The RotogartEatos' annual No-Thanksgiving feast is approaching and they have gathered hundreds of citizen Ogarts for the occasion. Officials say nothing can . . ."

SPLAT! Flip slipped and fell right into his newspaper as the entire sidewalk began to shake. "Double drat!" thought Flip, knowing that the front page was now transferred onto his puddy face. (Ogarts look like a glob of vanilla pudding with eyes and a mouth.) Then Flip looked up.

"Quadruple drat!" he bellowed. Flip realized now that he was no longer in downtown New Ogart. He was the victim of a RotogartEato raid.

Flip sat in the musty RotogartEato Lair and considered his options. He could wait and get eaten. Or he could try to escape, leaving all his fellow Ogarts behind. Or he could save all the Ogarts and become a national hero.

As the cries of his fellow Ogarts grew louder, the choice became clear: Wait and get eaten. But wait—was he not the star puddyball quarterback at Ogart State? Was he not voted first citizen of New Ogart? Was he not the president of Ogart Industries? True, he was none of these, but this inspired him all the more to do some heroing now.

A smile crept onto his face as he imagined the headline, "FLIP SAVES HUNDREDS—AWARDED MILLIONS." And it could all happen with a little help from his friend with the joystick.

FLIP OGART'S CHALLENGE

Flip Ogart continually bounces up and down. You control only his horizontal movement with the joystick. Thus, you are not in total control of Flip, and the two of you must cooperate to accomplish your goal—save all the Ogarts. Remember, although cursing Flip and causing him multiple deaths may ease your mind, it doesn't help the cause.

To play Rebound, type in Listing 1, REBOUND.BAS, check it with TYPO II and SAVE a copy before you RUN the program. You start with five Flips, receiving a bonus Flip for each successfully completed screen. If you think the RotogartEato Lair contains no obstacles to impede Flip's progress, you are sadly misinformed. Here's some of what to expect:

continued on page 61



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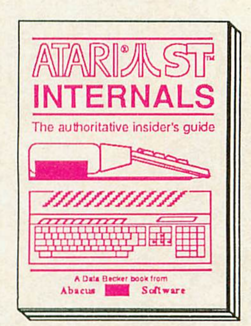
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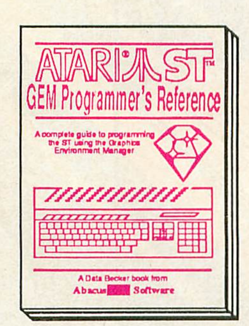
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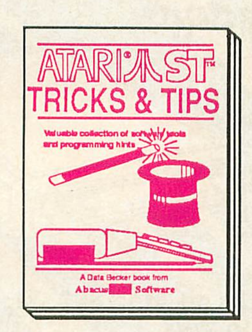
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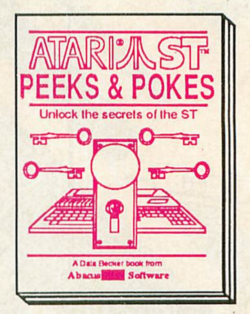
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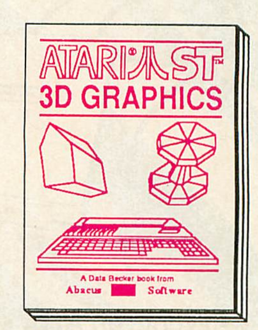
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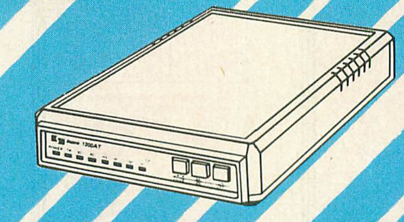
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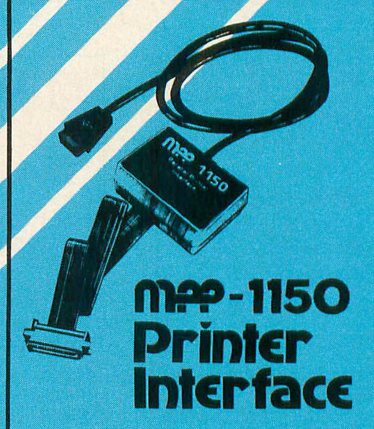


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CIRCLE 084 ON READER SERVICE CARD

REBOUND
continued from page 57

Ogarts: These poor creatures are crying out for Flip's aid. In order to save an Ogart, Flip only needs to touch it. Saving all the Ogarts on one screen will send Flip on to the next screen.

Invisible Barriers: Most of the walls in Rebound are visible, but some aren't.

Transporters: These look like harmless arrows. But when Flip touches one, ZOING! He breaks down into his components (milk, powder, sugar and preservatives) and instantly reassembles at a different arrow.

Side Gaps: A screen may have gaps in the walls at the top, bottom and sides. If Flip bounces out one gap, he'll reappear through the opposite gap.Switches: Touching a switch makes all action in the lair spin the opposite way. Switches look like rotating spirals.

Sucker Holes: Bouncing too close to a sucker hole will surely bring Flip's days to a close. These holes are squares that contain shrinking circles. But there is hope, for switches can be used to change sucker holes into blow holes.

Blow Holes: Blow holes send Flip flying. But these squares with expanding circles are as safe as can be. Be careful, though—touching a switch changes these safe blow holes into deadly sucker holes.

And, if that isn't enough . . .

RotogartEatos inhabit these screens. They know every wall and door there. RotogartEatos are red and their faces rotate. Some like to just loaf around in one spot, while others jump around the lair. You and Flip will have to beware though, for if Flip gets too close, he is certain to become a RotogartEato snack.

Rebound has *only* seven screens, but you can prolong the suspense indefinitely with the. . .

REBOUND CONSTRUCTION SET

The February, 1987 ***Antic*** *will feature a construction set for Rebound screens. J.D. Casten himself has agreed to judge a contest for the best Rebound screen creations. The winning entries will appear as an Antic Disk bonus later in the year and winners will get that month's Antic Disk Edition. See the February* ***Antic*** *for complete details*—ANTIC ED

INSIDE REBOUND

One of the first things to notice about Rebound is the full-screen animation. The program uses six alternate character sets and switches among them, allowing for the smooth animation and the movement of the RotogartEatos.

The only machine language used is a Vertical Blank Interrupt that updates the Player/Missile graphics for Flip, a Display List Interrupt that changes colors, and a short routine to link the BASIC variables to the machine code. An important key to the speed of Rebound is the use of B$. B$ has a byte for every character in all six sets. This byte tells what that character means (example, an O would mean that character is "Open" to bounce through, while a B would mean that the character is "Barrier."

One way to speed up joystick processing in BASIC is to set up an array variable. The X(J) array in line 1110 is predefined to change certain joystick values into directional values, such as in line 150. For example, if the joystick is pulled left, a PEEK at location 632 will show the value 11. The X(11) value has been set to -1, so that an X=X+X(PEEK(632)) will decrement X by one.

All action sounds are created in line 190. If Flip hits an oject, then H is set to the frequency, V is set to the distortion level, and T is set to the initial volume (which will decay).

An often-used general purpose machine code routine is M$, a "mover" routine that shifts any number of bytes from one memory location to another. This routine uses the form U=USR(ADR(M$), source address, destination address, number of bytes to move). The routine can also be used to set any number of bytes to a certain value. To do this, POKE the first byte with the value. Then do a U=USR(ADR(M$), first byte, first byte+1, number of bytes-1).

The lines between 9000 and 9099 are DATA statements for the character graphics. These lines were generated with a character set editor I have written. In fact, I programmed Rebound as a test of the character set editor. You can adjust this DATA in order to change the character shapes.

Here is a simplified Rebound program map:

4	User Definable Variables
100-199	Main program Loop
100-104	Machine update
105-149	Vertical movement and check
150-189	Horizontal movement and check
190	Sound
200-250	Death check and process
300-399	Off screen correction
400-499	New screen set-up
500-599	New Flip set-up
1000-1199	Variable and memory set-up
1200-1399	Title screen
1400-1499	New game set-up
1950-8999	Screens
9000-9099	Character Data
9100+	Set up DATA

Since 1983, J.D. Casten has been sending ***Antic*** *his off-the-wall, up-the-tree and round-the-bend games, which include* Box-In *(December 1985),* Risky Rescue *(April 1984),* Escape from Epsilon *(June 1984) and the now-classic* Biffdrop *(December 1984). The July 1985 issue contains TYPO II line codes for Casten's golden oldies. The Catalog carries the Casten Game Disk ($12.95, ADS0001). Casten is currently a computer science freshman at his hometown college, the University of Oregon.*

Listing on page 110 



PRACTICAL PROGRAM ★★ CONTEST ★★

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HOW TO WIN We are looking for the most powerful, versatile, easy-to-operate programs that perform useful jobs in the real world. The more uses for your software, the better. For example, a stuffed-animal database for taxidermists would probably be considered too specialized by the magazine's judges—no matter how excellently it is programmed.

The winning software must be user-friendly, most likely menu-driven wherever possible. Users should not need programming knowledge in order to successfully operate the application programs.

Please note that some of the other popular Atari program categories—such as utility routines that add power when inserted into your own programs—cannot properly be considered applications. Practical application programs should be complete, stand-alone software that does an entire user-controlled job from start to finish. For example, a drawing or painting program would be a practical application—a colorful graphics demo would not!

TECHNICAL RULES Programs must run on the Atari 800, 800XL and 65XE models and require no more than 48K memory. However, programs that *also* take advantage of the extra memory in the 130XE will be given preference.

Programs must be written in standard renumberable Atari BASIC or MAC/65 assembly language, under a disk operating system compatible with Atari DOS 2 or 2.5. Program listings cannot be larger than 150 sectors of a single-density disk.

Thorough error-trapping is very important. Your program should not crash every time a user accidentally presses the wrong key. And please do not include authors' copyright statements in your listing.

JUNE 15, 1987 All entries in the **Antic** 8-Bit Practical Applications Competition must be received by June 15, 1987. Winners will be announced in the November, 1987 issue of **Antic**. Judges' decisions are final.

Entries—programs and accompanying articles—should be submitted on disk *and* in printout. Entries will be returned only if the author provides a stamped, self-addressed envelope.

Send entries to:
Practical Applications Competition
Antic Magazine
524 Second Street
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All 8-bit practical application programs accepted for publication by **Antic** between November 1, 1986 and June 15, 1987 will also be automatically evaluated as potential prizewinners in the contest.

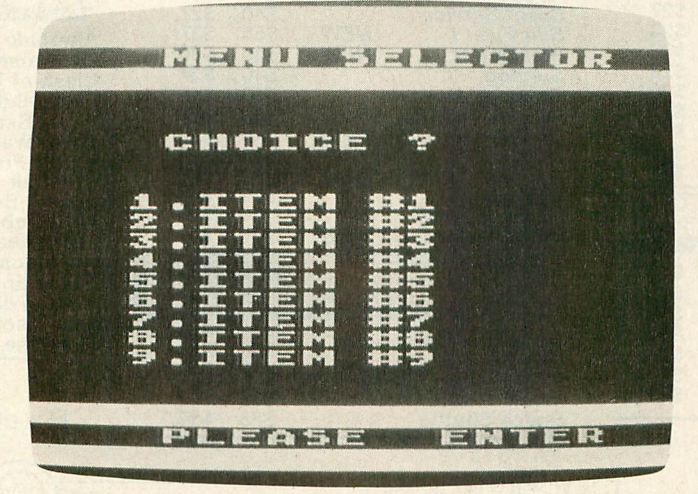
B Y E A R L H I L L

Menu Maestro

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Intermediate BASIC programmers can use Menu Scroller as the core program for applications such as school grades, or for users group monthly disk inventories. Just add the logic of the various subroutines and RETURNs to the main menu to complete your customized program. If you rename the program to MENU, you can use the AUTORUN.SYS file on the **Antic** monthly disk to automatically RUN Menu Scroller at boot time.

Type in Listing 1, MENU.BAS, check it with TYPO II and SAVE a copy before you RUN it.

If you have trouble typing the special characters in lines 352-356, Listing 2 will create these lines for you and write them to a disk file called MLINES.LST. Type in Listing 2, check it with TYPO II and SAVE a copy before you RUN it. Now LOAD the main program, MENU.BAS, and ENTER the file MLINES.LST. Remember to SAVE completed program before you RUN it.

PROGRAM TAKE-APART

Line 140 calls the subroutine at line 350, establishing the two machine language routines which create the fancy display and the scrolling prompt. Line 360 identifies P$, which is only used in the skeleton program to show which line is reached. Feel free to change P$ when using the menu with your own programs. Line 160 sets the five colors for the menu with the appropriate registers.

Lines 170-230 are the main loop of the menu. The item numbers are positioned a little to the left, so there is room for a longer selection to replace the item numbers. The subroutine calls in lines 180 set up the scroll for the prompt string (ME$ in line 370). The entire string scrolls from right to left at the bottom of the screen between two horizonal bars. In line 230, the "20" in the USR call is the scroll speed. Lower numbers give faster speeds. The number preceding the scroll speed is the location of the scrolling line.

Line 230 decodes your selection and branches to the appropriate routine. Line 330 selects the random color for the accent bars on the menu. To see the color variations, just keep pressing number selections.

The changes to the display list are persistent, so the background of the main menu can be used with subroutine title screens and appropriate color changes to produce distinctive subroutine menus. If you do this, a wide variety of other prompts such as formatting or accessing a disk directory can be placed on the screen instead of the INPUT statements as illustrated in the main menu.

Earl Hill lives in Erie, Pennsylvania. This is his first publication in **Antic.**

Listing on page 107

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ETC.

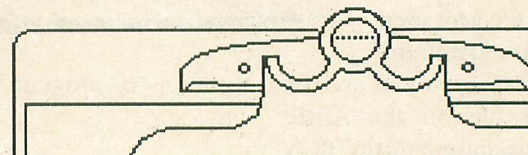
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Flight Simulator designed with Degas Elite by Jim Warner

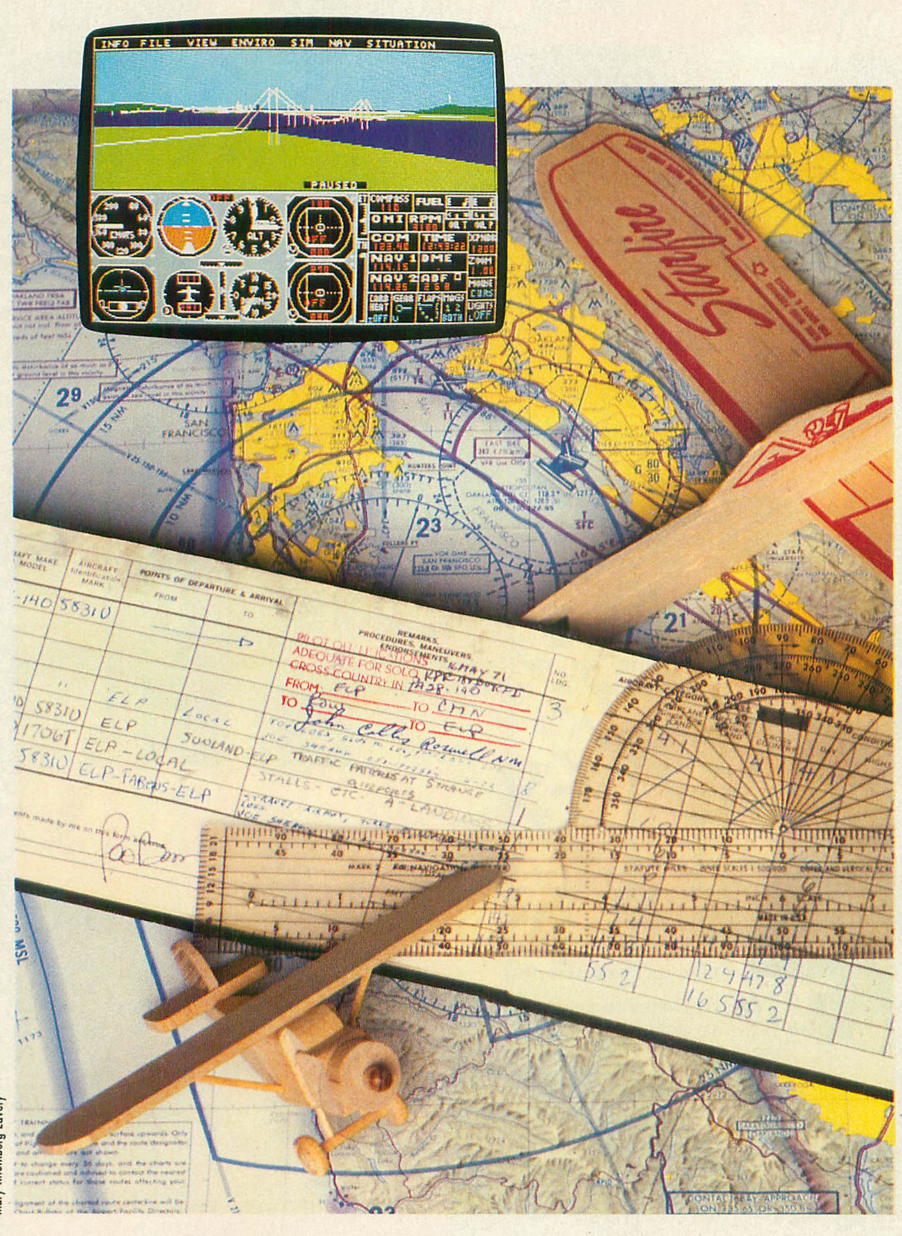
CONTENTS

ST Disk Subscribers: For instructions on how to transfer **Antic** ST programs to 3½-inch disk, see ST Help File on Side B of monthly disk. ST programs from previous issues are available in 3½-inch format from The Catalog.

REVIEWED BY CHARLES JACKSON, ANTIC TECHNICAL EDITOR

ST FLIGHT SIMULATOR II

The mouse that soared



Mary Rhomberg Lavery

Unlikely as it sounds, the most exciting ST software so far this year is a mouse-controlled flight simulator that offers more features than many professional pilot training units.

The **Antic** staff happily logged dozens of hours in the wild blue yonder with SubLOGIC's **Flight Simulator II** ($49.95) during the first weeks after the ST version arrived. The breadth and scope of the scenery and the precise flight maneuvering possible with ST Flight Simulator II are truly amazing—far more sophisticated than the 1984 version for 8-bit Ataris.

During our first few flights, we buzzed San Francisco's Transamerica Pyramid, flew *under* the Golden Gate and Oakland Bay bridges, circled Chicago's John Hancock tower, soared by the Statue of Liberty in New York, did a touch-and-go on Catalina Island's Airport In The Sky, flew a barrel roll around the Empire State Building, landed at the Moffett Field Naval Air Station near San Jose and parked *inside* one of the hangars there.

The ST edition includes a two-player World War I dogfight game for the "shoot-'em-up" set, a Learjet simulator for those who want a speedier and easier taste of flying, and a single-prop Cessna 182-RG (retractable landing gear) four-seater that offers the highest degree of realism.

The upper half of the screen is your view from the cockpit window, and the lower half is your instrument panel. Flight instruments are grouped on the left side of the panel, while engine instruments and radios are on the right.

MOUSE FLYING

Flying an airplane with a mouse and a keyboard is a clumsy ordeal. It feels as if you are trying to fly an airplane with one hand tied behind your back. There's too much work for a sliding and clicking mouse to handle. Nevertheless, it only takes about two or three days to get use to the mouse controls. The mouse becomes an acceptable nuisance in light of the program's versatility and power.

The mouse has two modes—

Cursor and Yoke. Yoke mode is used to steer the aircraft. An airplane's steering wheel is properly called a "control yoke."

In Yoke mode, you slide the mouse forward and backward to pitch the nose up and down, and slide the mouse left and right to bank the plane. Press the left button while dragging the mouse forward and backward to control the throttle, or drag leftward to apply the brakes.

In Cursor mode, the mouse moves an onscreen cursor which controls the flaps, radios, time-of-day, navigation systems, and numerous other features available from the drop-down menus.

Tap the right mouse button to toggle between these modes. You should become very familiar with both modes. Trying to set your flaps while in Yoke mode might send you tumbling into a barrel roll, while trying to fly the plane in Cursor mode would be as effective as taking your hands off the control yoke, closing your eyes and hoping for the best.

Fortunately, the program offers an option which lets you pause your flight whenever you enter Cursor mode. While paused, your plane is frozen in time and space, giving you time to think, look around and take a deep breath. When you're ready, tap the right mouse button to return to Yoke mode and continue flying.

Here is a sample, "no-frills" takeoff sequence:

1. The program starts you on runway 27-R at the Metropolitan Oakland International Airport, California. Your engine is idling.

2. If your mouse is in Cursor mode, tap the right button to put it into Yoke mode. Next, press the left mouse button and drag the cursor away from you. This is how to advance the throttle, and is equivalent to stepping on the gas pedal in a car. A vertical bar graph on the right side of the instrument panel tells you how far your throttle is advanced. Move the throttle to 100 percent. Next, lift the mouse from the table and place it back in its original position. (If you slide it instead of lifting it, you'll have too much "up" elevator and will have a hard time getting off the ground).

3. Slide the mouse from side to side to steer the plane down the runway. As your airspeed passes 60 knots, gently pull the mouse straight back towards yourself, until the runway drops away from the plane.

4. Go into Cursor mode and click on the landing gear icon (or press the [U] key) to raise the landing gear. Remember to return to Yoke mode once your gear is up.

Most people will tend to slide a mouse in an arc rather than a straight line. Thus, it's very difficult to lower the plane's nose without putting it into a small turn, or to apply the brakes without steering off the runway. Furthermore, any gradual, imperceptable mouse movement will be relayed to the aircraft's controls and slowly throw you off course.

In flight, most joysticks and control yokes tend to return to a neutral, centered position when left alone. If they're in a different position, the pilot only needs to feel the joystick or yoke to determine its position. The mouse is not self-centering, and you must check bar charts on the instrument panel to find out exactly where it is and what it's doing.

SPOTTER PLANE

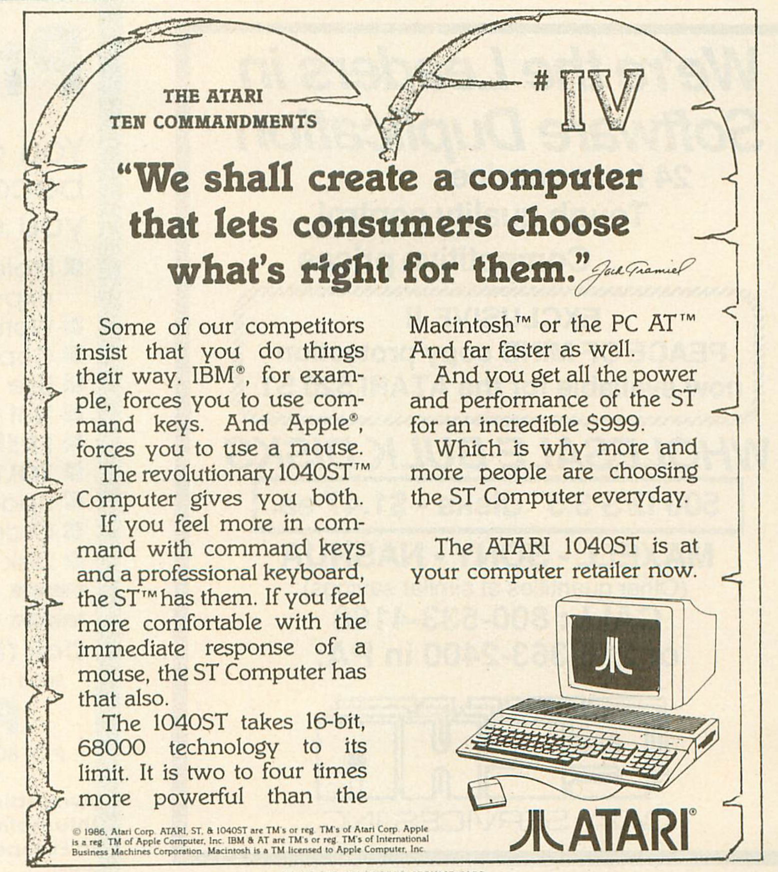
When learning to fly an airplane, it's important to see your mistakes. Often, your flight instructor will take you aside, flatten his palm to resemble an airplane, and say "Charlie, you're going like this (Swoosh) when you should be going like *this* (Swish)."

Flight Simulator II can give you an exterior view of your plane *while* you're flying it. The feeling is very similar to flying a remote control plane—you see your plane bank when you slide the mouse to the side, or see the landing gear move up and down when you press the [U] key.

These exterior views come from a "spotter" plane, an invisible aircraft constantly flying in formation with you, watching everything you do. You can observe your plane through the spotter plane's window instead of seeing the view from your own cockpit window, or you can watch both views at the same time.

You can put the spotter on either

continued on next page



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side of your plane, in front of it or behind it. You can also set the distance between your plane and the spotter, or program it to loop around you as you fly.

INSTANT REPLAY

At any time you may pause and watch an instant replay of the past 75 seconds of your flight. This feature becomes a very powerful learning tool when combined with a spotter plane. We'll use our takeoff sequence as an example. Assume that just after takeoff you pushed forward on the mouse, causing your plane to hit the ground again. For a clearer view of what happened, pause your flight and switch to your spotter plane's view of the action.

Now, turn on the instant replay. You'll see a movie of your plane rolling down the runway, leaving the ground, then landing again. Let's watch that again, but this time we'll move the spotter plane to a different vantage point.

Watching an instant replay from a spotter plane can be remarkably instructive, particularly when you're learning to land the plane. From the spotter's viewpoint you can see your glidepath, your touchdown point, and the overall smoothness of your landing.

The day Flight Simulator II arrived at **Antic**, we used these features to fly, record and watch our plane fly between the two towers of the World Trade Center in Manhattan. For even more spectacular views, your cockpit window may be expanded to fill the screen.

SCENERY

The early Link Trainers had no scenery at all. Subsequent simulators featured generic scenery—nondescript rivers, roads, runways and oceans. Such scenery made traffic patterns and local flights easier, but cross-country flights quickly became boring and predictable because there were only one or two possible runway and scenery configurations.

By contrast, once you see the surprising amount of detail present in ST Flight Simulator II scenery, you'll want to switch-on the autopilot and spend several hours sightseeing.

The buildings, bridges, mountains and runways which make up this scenery are not as pretty as computer pictures you might create with DEGAS. In fact, they look more like simple sketches done on a KoalaPad. You don't need a highly detailed rendition of the Empire State Building when you're flying over Manhattan. You just need to know where it is so you can use it as a navigational landmark. And Flight Simulator II places it precisely in the correct position.

In this respect, Flight Simulator II scenery is infinitely more useful than pretty computer drawings. For example, its representation of Republic Airport, (a small field in Farmingdale, NY near my Long Island hometown) shows both runways (14-32 and 1-19) facing in the proper direction, placed at the correct spot in Farmingdale, and set at the correct elevation.

Mike Kulas, programmer of the ST version of Flight Simulator II, said that scores of people spent hundreds of hours poring over aeronautical charts, reference books, digitized photos and even picture postcards to create these scenery databases. SubLOGIC urges you to tell them about it, if you notice any omissions in the scenery. And if the program becomes as popular as its eight-bit counterpart, SubLOGIC plans to introduce additional scenery disks this spring.

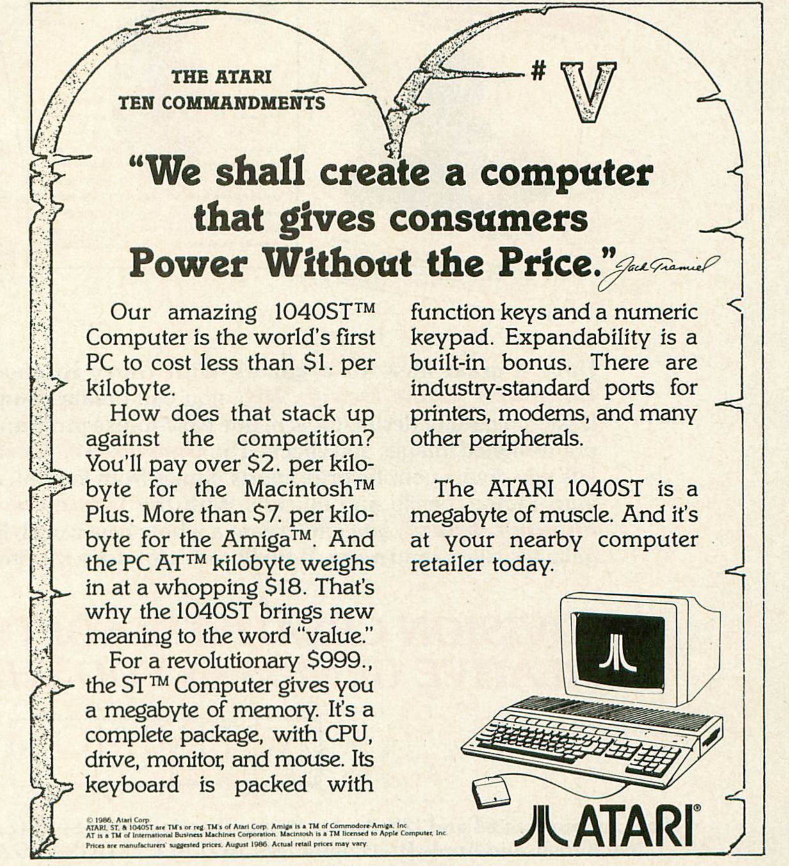
INTERACTIVE MAPS

The scenery data is also used by the Map function, which adds a small map to your cockpit window. Crosshairs in the center of the map mark your position. Initially, the map is about the size of a postage stamp, however you may expand it to any size.

There's also a "zoom" function which adjusts the scale of the map. If you're in a new area, "zoom out" to see your position in relation to the surrounding countryside. "Zoom in" for more detail to find the smaller airports.

There are three ways of getting around with ST Flight Simulator II. The most obvious way is using your throttle, stick and rudder. The two

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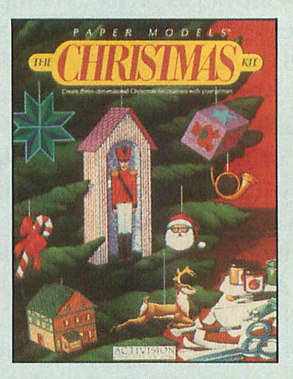
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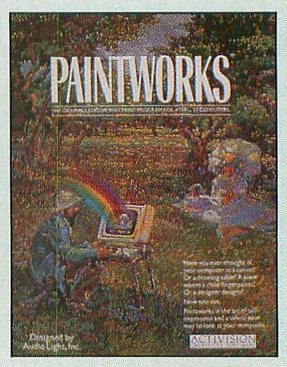
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other ways are "slew" and "position setting."

SLEWING

Slew could be nicknamed "flying carpet mode." A "slewing" plane is suspended above the ground, but capable of spinning and moving back and forth. Move the mouse to the right to spin the plane to the right. Move it left to rotate it the other way. Move the mouse forward to move the plane forward, and pull it back to move the plane backwards. Slew mode is useful for quickly setting up final approaches, as well as for sightseeing.

Slew mode also adds a text line to display your present map coordinates. These coordinates serve the same function as longitude and latitude, but the similarity ends there. The software's "north" and "east" coordinates do not correspond to traditional concepts of north and east. SubLOGIC supplies specially marked maps to help you find your way through the skies.

TELEPORTING

Finally, you can "teleport," or type-in the coordinates of your destination. This comes in handy when hopping between cities for a sightseeing tour. Just enter the desired north, east and altitude coordinates, and ST Flight Simulator II will bring you there. You may determine the proper coordinates from the maps included with your disk, or you can enter the coordinates of any interesting place you may have "slewed" to in the past. But be careful with your altitude coordinate, or you may find yourself underground.

SAVING A SITUATION

If you find yourself in a particularly interesting position, you can save it to a disk file and return to it at any time. The disk file contains your location, altitude, speed, heading, position of your flight controls, and everything else needed to recreate the situation.

You can store as many as 12 different situations at once. Your entire collection of situations will be written to a 4096-byte disk file named F7. If you want to save any more situations, you must either delete a previous one, or use another disk. You can only store 12 situations in a situation file, and you can only have one situation file per disk. For safety's sake, make each of your F7 files the only file on a separate disk.

ABOUT THE PROGRAM

ST Flight Simulator II is written in 68000 assembler and only uses GEM to read the mouse, monitor the keyboard and control disk I/O. SubLOGIC wrote their own custom graphics routines to handle everything else. "At the time ST Flight Simulator II was being developed, GEM and the Line A routines were still changing," said SubLOGIC's Mike Kulas, "so we wrote our own specialized graphics routines which were significantly faster."

WHAT'S NEXT

SubLOGIC's next product will be an ST version of Jet, their popular multiplayer hi-tech dogfight simulation currently available for Commodore, Apple II and IBM PC computers. Kulas says the ST version will be "much more sophisticated" than the previous versions." Jet will be faster and more colorful than ST Flight Simulator II.

Final versions of Jet are expected to include multiple 3-D views, a variety of weapons, tracking systems and moving scenery. This scenery will include lightning, jet trails, explosions, sunsets, music and other sound effects. Expect to see Jet early this spring.

Antic Technical Editor Charles Jackson is a licensed Private Pilot and was a Link Trainer Engineer for the Long Island Air and Space Museum.

FLIGHT SIMULATOR II
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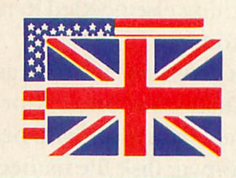
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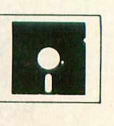
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CIRCLE 029 ON READER SERVICE CARD

BY PATRICK BASS, ANTIC ST PROGRAM EDITOR

ASSEMBLY LANGUAGE TALKER

Talking Typewriter for ST

This month we show you how to build, install, and program an ST hardware speech synthesizer using a standard Radio Shack chip. Before you can use the ST speech software described in this article, you need to build the speech synthesizer circuit as explained in the *Talking Typewriter* article, elsewhere in this issue. ST programmers, however, will find it useful to examine the *ST Machine Language Talker* just as a demonstration of how to drive external speech hardware.

TYPING IT IN

Assembly Language Talker is written in 68000 Assembly Language as implemented by AS68.PRG, the assembler included with the Atari Developers Kit. But nearly any 68000 assembler which conforms to standard Motorola mnemonics will also work—examples include the MetaComco Macro Assembler and A-Seka.

Like our WEFAX program published in September 1986, Assembly Language Talker doesn't realize GEM exists. You'll also notice that this program is somewhat longer than the 8-bit BASIC version. That's because when using assembly language we need to specify low-level control structures such as how to display a character on the screen or get a character from the keyboard. BASIC takes care of these things more or less automatically.

Use your favorite text editor or word processor to *carefully* type in Listing 1, TALKTYPE.S, and save a copy to disk.

(Antic Disk subscribers: Skip down to the Program Operation section of this article. TALKTYPE.S is on Side B of the monthly disk. Follow the ST Help file instructions to transfer the programs from the 8-bit disk into the ST.)

After you type in Listing 1 and save a copy, you must assemble it into an executable program. While other assemblers may operate differently, the method I use with AS68.PRG is as follows. First, you will need a disk with the following ten programs on it.

1. AS68 .PRG
2. AS68SYMB.DAT
3. BATCH .TTP
4. LINK68 .PRG
5. OSBIND .O
6. RELMOD .O
7. RM .PRG
8. WAIT .PRG
9. ASM .BAT
10. TALKTYPE.S

The top eight programs are in the Atari ST Developers Kit, and you just typed in TALKTYPE.S. But what about number nine, ASM.BAT?

You'll need to create your own ASM.BAT batch file, but it's very short. The file contains the following lines of code:

```
as68 -l -u %1.s
link68 [u,s] %1.68k=%1,osbind
rm %1.o
relmod %1.68k %1.tos
rm %1.68k
wait
```

Note that the -l in the first line is a lowercase letter l—all the other similar looking characters are the number one.

You may type in this file with any text editor. When finished, save the above file to disk as ASM.BAT. This is the file which will instruct the BATCH program how to assemble and link the TALKTYPE.S program.

With all the needed files on one disk, double-click on BATCH.TTP. In the resulting dialog box type ASM TALKTYPE *without* the **.s** extender. AS68 will assemble your source code into an *object* (.o) file. LINK68 will the resulting **.o** file with OSBIND.O to create a finished TOS program. When finished, you'll find TALKTYPE.TOS on your desktop. This is the Machine Language Talker program.

PROGRAM OPERATION

Essentially, the program teaches the ST to wait for a keystroke. When a key is pressed, its value is checked. If the key is a letter or a number, we use the value of the keystroke to access the phoneme codes that will speak the letter or number. We then send these values one-by-one out of the printer port, which is connected to the speech hardware.

The first six lines are comments which introduce the program. Below that are constant declarations, which substitute names for numbers throughout the rest of the source code.

The program begins at the label **start**. The first block of code here was taken from APSTART.O, so you wouldn't need to link it later. This code is needed because whenever an ST program starts running, it "owns" all of the ST's memory and needs to release what it doesn't need. This code measures the size of its program and data sections, adds a small amount of room for its own stack

continued on next page

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CIRCLE 056 ON READER SERVICE CARD

space, and then returns whatever memory is left back to GEM.

Much of the program's work is done at **_main**. We first point to and then display the opening message, then drop down to **mainloop**, where we keep an eye out for keystrokes. When one is received, we perform the subroutine **decodekey** and then check for more keystrokes.

Below, in **decodekey**, we decide which key was pressed. Paramount in importance to us is the [ESCAPE] key, which will cause a branch to **terminate** when it is detected. Otherwise, we determine if the key was an uppercase or lowercase letter, or a number key. If it was, we use the value of the keypress as an index into a table of addresses which points to the individual phoneme strings for each letter or number.

For example, assume a user pressed the uppercase letter B. Once we decide which key was pressed, we determine its position in the phoneme table. Since letter A is the first letter in the phoneme table, we may subtract its ASCII value (65) from the ASCII value of any other letter to determine that letter's relative position.

In this case, we're subtracting 65 (the ASCII value of A) from 66 (the ASCII value of B). The resulting value is one, which tells us that B occupies position number one in the table (A occupies position number zero).

The phoneme table is composed of 26 four-byte addresses, so we multiply our result by four (with a double left-shift). We add the resulting index to the base address of the phoneme address table to find the address of the phoneme string to speak.

This work is done in the **talk_out** routine. As we enter the routine, we are holding the address of the desired phoneme table in register **a1**, and the number of the letter or number to speak in register **d0**. We multiply the character number by four (with a double left-shift) and then use it as an index into the phoneme address table to find the proper address. We place this address into register **a0** and reset the phoneme count by resetting register **d0** to zero. Then the program falls down into **talker**.

TALKER

Register **a0** now points to the proper phoneme string to speak. Register **d0** contains the index into that string, currently zero. We pick up the next available phoneme value from the phoneme table. If the number is a zero, then we have reached the end of this phoneme string and we may return.

Otherwise, we have picked up a valid phoneme value. So we branch to **talk_more**, which pushes valuable registers on the stack and pokes the phoneme value out the printer port. The speech board is cleverly designed to respond as a printer would, so the ST just thinks a printer is connected. Then we increment **d0** to point to the next available phoneme value, and loop back to get the next character.

LAS MESAS

Next we find a table of phoneme values which comprise the default phrase spoken whenever [RETURN] is pressed. This table has each word spoken on a different line. Below them we find the table of phoneme string addresses for letters—in alphabetical order—and then the table of phoneme strings for the letters themselves. Below them we find a similar set of tables for the numbers.

Skipping over the string of bytes which make up the title message we come upon **terminate**, which contains code to properly exit an application and return to the GEM desktop. Next, **message** will accept a null-terminated-string address in register **a0** and output it to the console. This routine, in turn, calls **charout**, which is the routine that makes the GEMDOS call to output a single character.

As the program starts closing down, we see **scankey**, which checks the console to see if any keys are available. If so, the character is retrieved, or else a zero is returned. Below that we find the **bss** (Block Storage Segment) where room for un-initialized data is kept. Here we just save room for **my_stack** and then END the program. Listing on page 114

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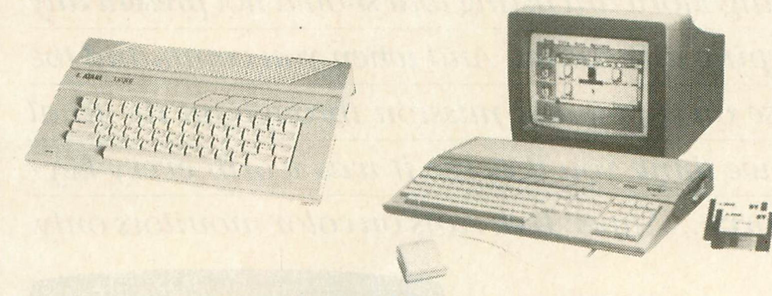
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by Stephen Everman and Paul Pratt

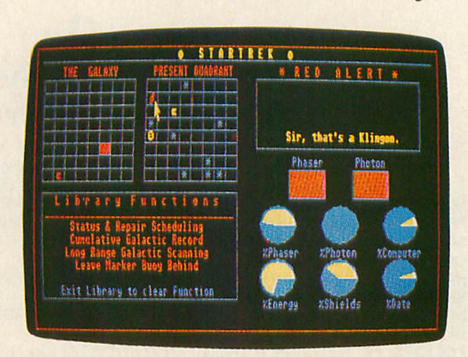
SUPER TREK IN ST BASIC

Play the ultimate Star Trek game

*Here's the breakthrough that all you ST BASIC hobbyists have been waiting for. Super Trek is an ambitious, commercial-quality GEM version of the classic public domain Star Trek game—and it's all done with ST BASIC. Nearly nine pages long, this is the biggest ST BASIC program ever published by **Antic**. But Super Trek is a clean, straightforward listing that should not present any undue typing difficulties. And when you command the Enterprise on a 360-day mission throughout the final frontier, we think you'll agree it was worth every keystroke. Sorry... Super Trek runs on color monitors only.*

On the "Star Trek" shows, it all seemed so easy. Captain Kirk and company would hop from planet to planet—sometimes beaming down to vanquish exotic monsters—enter skirmishes with various space scum, occasionally disobey orders from Star Fleet Command or violate the Prime Directive and still come up smelling like a rose. Super Trek—for STs with color monitors only—isn't as simple as that.

Remember those clipboards that



the various curvaceous yeomen handed Kirk from time to time? They held energy consumption reports, among other things, and could not be ignored. That's part of what you'll have to deal with here. Your assignment as the new Commander of the United Star Ship Enterprise is to spend the next 360 days doing anything you want—as long as you destroy the prescribed number of Klingon vessels (usually around 25 or 30).

The Atari ST is the final frontier for the classic public domain Star Trek game. Written entirely in ST BASIC, it boasts an arcade-quality color display and total mouse control via menu boxes and icons. You'll zoom through the galaxies and do battle with Klingons, just like the old days.

BLAST OFF

The Super Trek screen has one grid showing the entire galaxy and another with just the quadrant you're in at the time. Travel to a new quadrant at Warp Speed by clicking on a quadrant box in the galaxy grid-map. If there is a Klingon ship in the new quadrant, it's time to click on red alert.

A message window gives you status reports during battle. Pie charts show the remaining percentages of phaser power, photon torpedos, computer capability, energy, deflector shields functioning and how much of your 360 days are left. The pie slices removed from the graphs can be huge, so keep a close watch and make sure to warp frequently to a star base for repairs.

The Library Functions window offers the choice of Status & Repair Scheduling, Cumulative Galactic Record, Long-Range Galactic Scanning and leaving a Marker Buoy behind.

While in drydock, repairs can be authorized by clicking on Status & Repairs Scheduling in the Library Functions window. This calls up a small spreadsheet showing present computer capability, shields and phaser status, the goals for these (set by you with the mouse buttons) and the energy units and days needed for repair. When you have set your goals and decided how much time to spend at the star base, click on Authorize Repairs to get set for departure.

The Cumulative Galactic Record shows each galaxy you've visited. But

if the computer is damaged, it will show random question marks in places. The Long-Range Scanners take in the area around you. This can help, but it expends a great deal of energy. Marker Buoys can be left to show where you were, but must be replaced whenever you re-enter those areas.

In combat, click on the square for either the phaser or photon torpedo. When the cross-hair cursor appears, click on the Klingon ship. The phaser beam is more powerful than the photon, but it loses strength as it and the computer take damage. Since the photon torpedos are physical bombs, they won't lose power. But, again, they won't do as much damage as the phaser and you can only carry six at a time.

Super Trek will be a lot easier to play if you remember these hints: Keep your shields up. Make small galactic moves and make repairs often. Be careful of quadrants with more than one Klingon ship, because they'll gang up on you. Remember, the game becomes more and more difficult after each successful voyage.

TYPING IT IN

Carefully type in Listing 1, STARTREK.BAS, using either the editor built into ST BASIC or your favorite ST word processor. If you use a word processor, be sure and save the file in ASCII format. (See this issue's Tech Tips page for more information about using word processors to type in ST BASIC listings.) When you finish, run TYPO ST and generate the TYPO Table for Super Trek. Check each line entry. If one of the checksums doesn't match, recheck how you typed that line.

(NOTE: We've discovered ST BASIC will ***drop*** *the very first character of a text file when it tries to read the file. For this reason, ST BASIC sees line 1000 as line 000 and calculates the incorrect checksum. The fix is to either disregard the first line or insert a single carriage return as the first character in the file.*—ANTIC ED*)*

Antic Disk owners: STARTREK.BAS is on SIDE B of the January monthly disk. Follow the ST Help file instructions to transfer the programs from the 8-bit disk to your ST.

PROGRAM BREAKDOWN

Lines 1000-1040 make up the title and copyright information. Line 1060 through 1590 hold program initialization information. This is where the screen is drawn and colored. Lines 1610 through 1960 contain the MAIN loop, where the game logic actually lies.

The work is done inside the **while. . .wend** loop. Here we watch where the mouse is pointing, and respond appropriately if a mouse button is pressed. When *both* buttons are pressed, the program will fall out of the **while. . .wend** loop and determine the outcome of your battle with the Klingons. You are asked if you wish to play again.

The next four subroutines support your final outcome. One of these is called for each condition possible, either Success, Failure, Incompetence, and Play Again. Between lines 2270 and 2350 is the subroutine that draws the pie charts used for the onscreen power indicators.

The subroutine GALAXY updates

continued on next page



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the active quadrant when you change position on the galaxy grid. PHOTON and PHASER are called when you select either weapon to use against the Klingon slime. DESTROY is called when you finally defeat a Klingon ship.

Between lines 3470 and 3550, the subroutines HIT.SHIELDS, HIT.PHASERS, and HIT.COMPUTER are activated whenever the Klingons manage to land a hit on the Enterprise. Down at line 4120, the subroutine LIBRARY is called whenever you move the mouse pointer into the Library Box below the two position maps onscreen. If you choose one of the Library Functions, control is passed to DO.LIBRARY, where the proper function is determined and control is passed on to the proper routine, either REPAIR, GALAXYMAP, SCAN.GALAXY, or SET.MARKER.BUOY.

FINAL FRONTIER

Whenever you select a new destination for the Enterprise, control is passed to MOVESHIP, at line 4780. The destination is scanned to check for occupancy and, if the area is unoccupied, the Enterprise's location is changed. If you move the Enterprise to a star base, the subroutine DOCK is called, allowing you to repair systems—if there are no Klingons attacking.

Should you desire repair service while docked at a star base, the subroutine REPAIR is called. In the library Box, the repairable functions will appear, along with the amount they need to be repaired. Point at the function you want repaired, and press the left mouse button to increase, or the right button to decrease, the level of repair.

The subroutine SETUP in lines 6270 to 6410 reseeds the Galaxy with stars, star bases, Klingons, and the Enterprise. FLASH causes the screen to flash whenever you destroy a Klingon. This routine and the following one, KOLOR, perform something interesting on the ST.

First, they read four color values into an array where each entry is 16 bits wide, then poke the address of the array into where GEM keeps track of where its current color palette is located. This instantly changes the available colors on the ST screen, much faster than the ***color*** statement.

Next, we find subroutines to perform some of the common GEM functions. The SET.MOUSE.SHAPE subroutine actually do just that, given the desired mouse shape number (0-7) in the variable POINTER. SHRINKBOX and GROWBOX perform the "moving box" effect whenever you warp the Enterprise to another section of the Galaxy. POLYLINE and PSTRING perform GEM functions for drawing a line and placing graphic text on the screen.

Super Trek is the third in a series of classic public domain games rewritten in ST BASIC by Paul Pratt and Stephen Everman of Hayward, California. ST BASIC Hangman *appeared in the November, 1986* ***Antic****, and* Deduction *appeared in December, 1986.*

Listing on page 116

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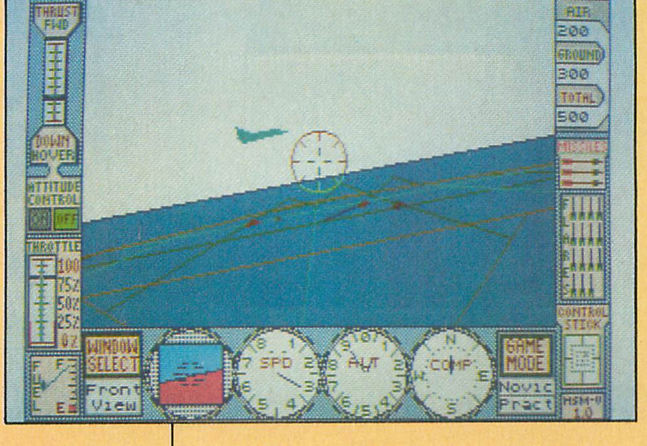
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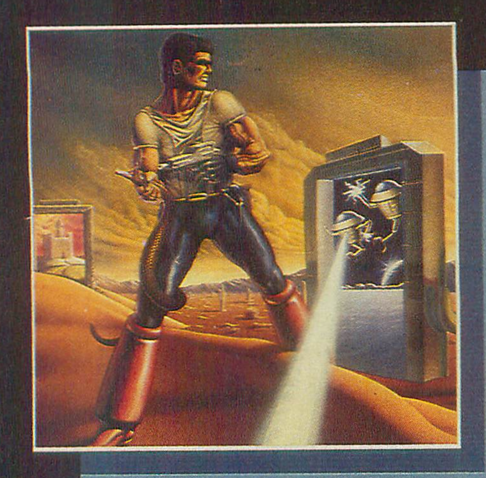


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by Bill Dunlevy & Harry Lafnear

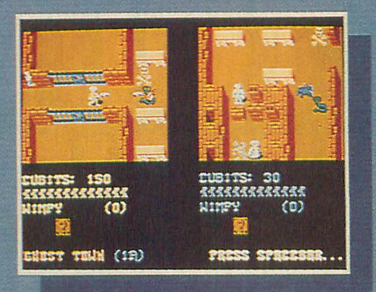
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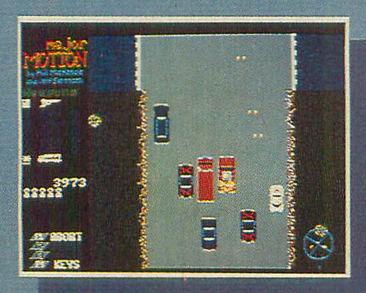
by Philip MacKenzie & Jeffrey Sorensen

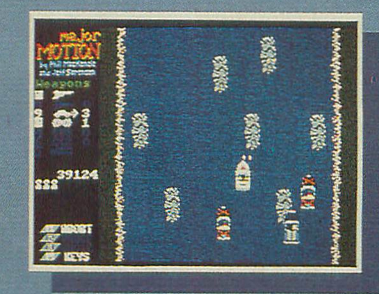
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MODULA-2: DEVELOPERS VERSION

More features, more power

Reviewed by SOL GUBER

TDI's **Modula-2 Developers Version** is a significant improvement over its Modula-2/ST (reviewed in **Antic**, May 1986). The two-disk package now contains high-level functions, a new GEM desktop for linking the various parts of the programs, a debugger, an optimizer, a resource construction kit and improved documentation. It even shows you how to make desktop accessories.

Is it better than C? If you think C stands for Cryptic or Complicated, then Modula-2 is the way to go. But if you think Pascal is rigid, then Modula-2 is even more so.

Modula-2 has several advantages over Pascal. Specially-designed functions let you change one type of variable into another. For instance, INTEGER(i) changes (i) to an integer and CARDINAL(i) changes (i) to a cardinal number. You can also perform multitasking operations and use machine language and low-level functions inside Modula-2.

Modula-2 uses definition and implementation modules. The definition module, usually written first, consists of the variables and procedures to be accessed from the implementation module. This information is *exported*, and other modules can *import* it when necessary. Definition modules are easily written since few of the details about how the procedures work need to be considered. When the definition module is compiled, the Modula-2 compiler ensures that any module importing a procedure follows the rules set up by the definition module, and any deviation from this is flagged as an error.

TDI has doubled the size of the Modula-2 manual. A large introduction explains a lengthy program that shows off the ST's graphics capabilities. The appendix also has a listing of the procedures that make up GEM, AES and the standard libraries of Modula-2. An index shows where all the procedures can be found. The listing of the procedures now tells what the parameters mean and how to vary them to get the desired effect. While it's not as complete as the documentation for the Atari C Developers Kit, it is quite good.

NEW PROCEDURES

There is also a series of new high-level procedures combining several GEM or AES procedures. For example, you can make a menu in one step rather than using the Resource development kit. There are even the makings of a turtle language in the low-level commands.

The third new feature is the Modula-2 GEM desktop that shortens the edit-compile-link steps and has icons for an editor, a linker, a compiler, a debugger and a trash can. The editor generates files ending in .MOD, and the compiler's output ends in .LNK. The linker's output is .PRG files to be run. Definition files end in .DEF, and once com-

continued on next page

piled they end in .SYM.

Using the desktop is easy. If you have an icon called WORD in the edit column, clicking on it invokes the editor and brings that file into memory. When you come back to the desktop, the WORD icon in the link column will be shaded, signifying that modifications have been made. Clicking on WORD loads the compiler and generates a new link file. You do not need to select the file to be linked. Now the .PRG file will be shaded, signifying a change in the link file. Clicking here invokes the linker and generates a new program which can now be run.

To use the desktop, an accessory shows the paths to be searched for the necessary parts of the program. Thus two floppy drives or a hard disk are easily supported.

Another new portion of the Developers Version is the MegaMax Resource Developer similar to the one in the Atari Developers Kit. It uses pull-down menus and lets you bring items to the proper spot with the mouse. You can produce menus, alerts and dialogs with the development kit. It also lets you create your own icons and use them in your program.

The resource developer is full-scale and doesn't seem to have any bugs. The code it produces is compatible with the Atari Developers Kit and it also produces files which can be included in your Modula-2 program. Another program in the kit takes a compiled resource (a file ending in .RSC) and translates it into Modula-2. It writes the proper object file structures and loads the resource into the object tree. These programs are included only in the TDI Developers Version.

Now has high-level functions, a debugger, an optimizer and more

The optimization procedure links only procedures used in the various import files. The accessory included in the Developers Version has several options that can be turned on for use with the debugging operation. One option is that the code for the linking step can be optimized, reducing it by about 40 percent but increasing the link time by about 10 percent.

FULL DEBUGGER

The best part of the program is the full post-mortem debugger. If a runtime error occurs, a complete dump of memory is automatically saved. This is most useful if you have a hard disk, since the dumps can be over 300K of information. After this, you can go into the debugger window and find the source of the problem.

Four windows are available for looking at your program in the debugger. The process window shows the activated procedures at the moment of error, highlighting the exact procedure. The data window shows the values of the variables when the error occurred. The text window shows the source code of the separate module where the the error happened. Finally, you can scroll through memory to see the exact dump at the error.

To help with debugging, TDI has modified the HALT command by making it a runtime error. When the program sees a HALT, the error procedures are invoked and you can fall out of the program.

To further aid in the use of the debugger, there is a decompiler of the .SYM files. There is even a 68000 disassembler included so that the exact action of the compilers can be seen.

The Developers version of the Modula-2 has many features to recommend it. It completely supports GEM and AES. It comes with a resource development kit which can embed the resource directly into the program. The manual has been improved. Macros have been written to simplify using AES. The edit-compile-link step has also been simplified through the use of a Modula desktop. The disks are not copy protected and are easily transferred to a hard disk. The language is almost entirely compatible with Pascal, so it is easy to learn. All in all, this is quite a tool for the Atari 520ST programmer.

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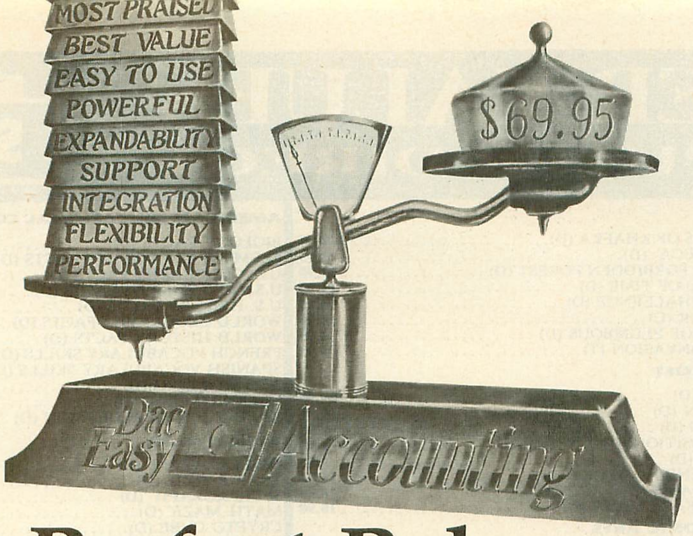


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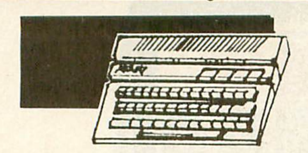
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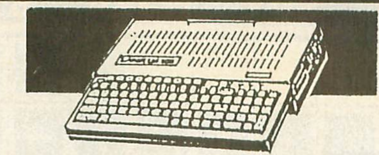
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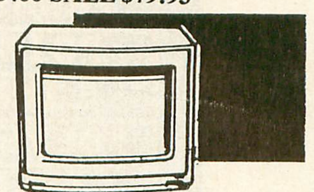
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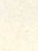


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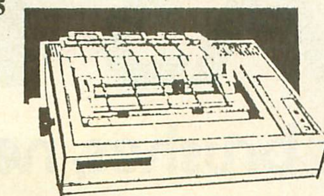
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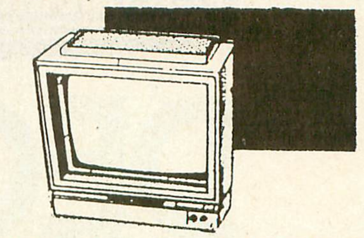
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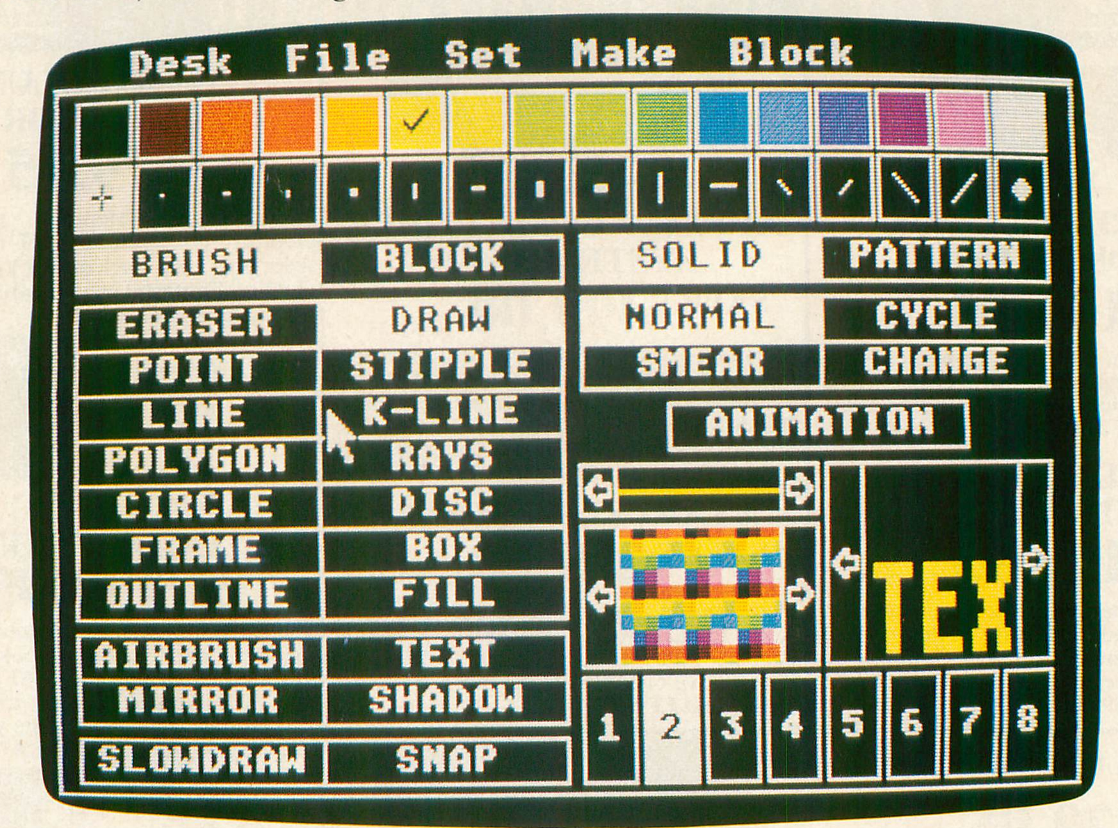
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by PATRICK BASS, Antic ST Program Editor



DEGAS ELITE

Animation, block brushes, new features galore

Programmer Tom Hudson (DEGAS, CAD 3-D) has outdone himself with **DEGAS Elite** ($79.95) and deserves another ST Applications medal. This second-generation ST picture processor adds many new features, as well as more power for old functions. By many estimates, DEGAS has been the biggest-selling ST program to date. And I'm sure most DEGAS fans will want to take advantage of the current half-price upgrade offer from Batteries Included.

At first glance, DEGAS Elite operates very much like the original DEGAS. You control your program from a menu screen and you draw on a work screen. The right mouse button toggles between these two. DEGAS Elite still works in the two color resolutions as well as monochrome high resolution, so it can be used with any ST monitor.

But now DEGAS Elite allows as many as 8 separate work screens for individual pictures on a 1040ST. A 520ST has room for up to four screens. You can cut and paste sections of pictures between each other. For example, cut a ball out of picture one and paste it into picture two. Or paste multiple copies of the ball into picture two. Or use the cut-out ball as a *brush*.

BASICS

The menu screen in DEGAS Elite has something the original DEGAS didn't have—a real GEM menu. Across the top of the screen you'll find the selections Desk, File, Set, Make, and Block. Below the menu is a bar showing available colors for the resolution you're working in. On the left of the screen are command boxes and the right side of the screen shows the current fill pattern, line style, and text shape. Eight numbered boxes along the bottom indicate the current work screen in use.

Almost any feature you can access with the mouse in DEGAS Elite may also be activated with keystrokes. The most important key is still the [UNDO] key, which erases any mistakes before they become permanant.

The current color is shown checked in the palette and also in the text, line, and fill boxes. You can change the current palette color by double-clicking in the palette box, then moving the RGB slider bars—in a pop-up dialog box—up or down un-

til you get the color you want.

You can copy a color from one palette entry to another by click-dragging the desired color over. If you wish to define a smooth range of colors from, for example, red to green, just define these two colors anywhere in the palette, making sure they're separated by at least one color box. Now select one of the colors, and click on the other while holding down the [ALTERNATE] key. DEGAS Elite will automatically calculate the new colors and insert them for you.

Can't figure out how to mix just the color you want? Click on [PICK] from within the color change dialog box and DEGAS Elite pops up a screen which has all 512 possible colors on it. Find the color you want, click on it with the mouse, and DEGAS Elite inserts the new color into your palette.

Remember how the original DEGAS made you cycle through all the fill patterns to locate the one you wanted? DEGAS Elite now lets you scroll forward *or* backwards through the fill patterns. Don't want to scroll? Double-click in the FILL box, and a dialog box opens up showing all 36 available fill patterns. Want one? Just click on it.

From the menu screen, you may draw a picture using any of the following styles.

BRUSH: Gives you a selection of sixteen (one user-definable) brushes to paint with.

ERASER: Wipes out markings, using the brushes available above.

POINT: Leaves only a single point every time the mouse is clicked.

LINE, K-LINE: Allows you to specify the starting and ending points of a line. In K-LINE, the endpoint becomes the starting point for the next line segment.

POLYGON: Like K-LINE, but the last endpoint is connected to the starting point.

RAYS: Using a definable centerpoint, draw a line to selected points around the center.

CIRCLE, DISK: Draw either the outline, or a solid circle (or oval) using the current fill pattern/color.

FRAME, BOX: Draw either the outline, or an solid box/square using the current fill pattern/color.

OUTLINE: Use a new color to outline any object.

FILL: Fill any shape with a pattern or solid color.

AIRBRUSH: Create an airbrush drawing effect for shading or blending.

TEXT: Type words right on the picture, using a variety of available fonts.

MIRROR: Your drawing actions will be repeated automatically in other sections of the drawing screen.

SHADOW: Your line drawings or text can have drop-down shadows in any colors/fills available.

SLOWDRAW: Sometimes the mouse is too fast to be precise. Use SLOWDRAW and the mouse movement can be slowed down by a user-definable amount.

SNAP: Align your image to a series of coordination dots which may be a user-definable number of dots apart. For example, you could draw an image which only recognizes every eighth pixel.

SOLID, PATTERN: Allows you to draw using either the currently selected solid color or the current fill pattern.

SMEAR: You can *smear* the boundary between two different onscreen colors.

CHANGE: Allows you to *selectively* change only the color pixels you want to, without disturbing the integrity of the screen.

NORMAL, CYCLE: An image can be drawn using either the stock, non-moving color palette. Or you set the palette to cycle through colors—and produce *animation* effects.

ANIMATE: Here's a good one. Atari's first picture processor, NEOchrome, had a simple color-cycle picture animator. DEGAS Elite, on the other hand, allows as many as *four* individual color-cycle sequences to be performed simultaneously. The color sequences may even be overlapped, resulting in spectacular special effects. Each sequence has its own direction and speed control. (I experimented with this effect in the flashing lights of my Holiday Inn Great Sign — which we ran as an Antic Disk Bonus this month and last month.)

PLAYING WITH BLOCKS

Normally, you use BRUSH mode to draw with. However, in BLOCK mode, DEGAS Elite allows the manipulation of sections of pictures, called "blocks," in different ways. To capture a block from a picture, press the [ESCAPE] key. Crosshair lines show up on the screen. You use these as the cursor to select the upper left and lower right corners of the picture block you wish to cut out.

What if the block you want isn't rectangular? Press [SHIFT] [ESCAPE], and a smaller, thicker crosshair cursor appears. Use this cursor to draw a K-LINE around the section you wish to be the block.

What can you do with a block? Here we find where DEGAS Elite really shines. The primary Block Commands are:

STRETCH: Stretch a block horizontally or vertically (or both). The displayed image will get larger or smaller than it originally was. By holding down [CONTROL], [SHIFT], or [ALTERNATE] you may restrict stretching to keep relative size, allow only horizontal stretching or vertical stretching.

ROTATE: You can rotate any block in either direction in *single-degree* increments. The resulting angle is displayed along the top of the screen. For example, you may tilt a picture by 14 degrees, if you desire.

H-SKEW, V-SKEW: You can "skew" (slant) a block horizontally or vertically. In other words, you can make an image element "lean over" like the Tower of Pisa.

DISTORT: This is one I like a lot. Picture the block onscreen, surrounded by a rectangle. Using the mouse, click-drag any corner of the rectangle *anywhere else* on the screen. Do this with any of the corners, then hold down [ALTERNATE] while you click anywhere inside the new polygon. The picture will be stretched and distorted, into the new shape you requested. Great for turning square pictures into pictures viewed "in perspective," among other things.

continued on next page

FORMAT: You can save picture blocks as either IFF files (meaning you can share "clip-art" with Macintosh and Amiga Computer owners) or save them as Icon Files which will be usable from the Resource Construction Set or any other utilities you may design.

You can also press the cursor keys to flip or reverse the block image.

GEM MENUS

DEGAS Elite uses the complete GEM interface. Along the top of the menu screen you'll see a GEM menu with these items available.

The FILE menu allows users to set the current disk drive, select a resolution to load the picture in, (you can edit any resolution picture regardless of the resolution you're working in), turn Picture Compression on or off, load a picture, load a color palette, load an image *without* the palette, save a picture to disk, delete a picture off the disk, erase the picture on the current screen, select the printer configuration file, Print a picture on your printer, or Quit DEGAS Elite completely.

The SET menu contains features which duplicate those available by double-clicking function boxes on the menu screen.

The MAKE menu allows you to choose user-definable shapes for line styles, fill patterns and brush shapes.

DEGAS Elite also comes with a complete Font Editor for creating your own custom character sets to use with DEGAS Elite. Create your font, then place its name inside the ASSIGN.SYS file so DEGAS Elite can use it.

WHAT'S LEFT?

What else could they possibly put in this package? Well, by pressing the [F1] through the [F10] keys you can zoom in (ala FATBITS) on any picture, from 3X to 12X in magnification. While in magnify mode, you can still scroll around the main picture, with a small outline showing exactly which part of your picture is magnified. Choose different colors, or a new magnification, while in this mode.

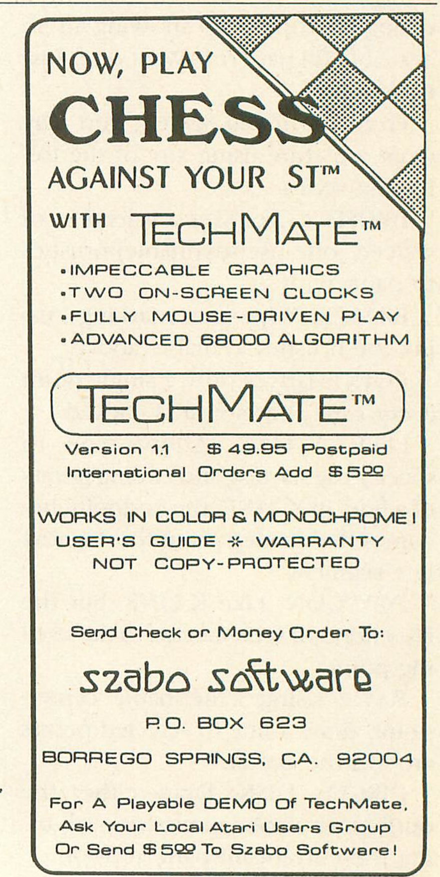
DEGAS Elite will also allow you to load in pictures created on other computers—even the 62-sector uncompressed format pictures used on the Atari 8-bit models! Speaking of compression, DEGAS Elite will assume you want your pictures saved in a compressed format unless you tell it not to. You can save many more pictures onto a disk with compressed files. But remember, you cannot load a DEGAS Elite compressed picture with the original DEGAS.

Whew! Believe it or not, that's not all. But I've run out of room. To wrap up, DEGAS Elite is one ST program you absolutely must have. And if you already own the first DEGAS, just send in your original disk with *half* of DEGAS Elite's low $79.95 list price and you'll get the upgrade.

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CIRCLE 001 ON READER SERVICE CARD

ST New Products

by GREGG PEARLMAN, **Antic** Junior Editor

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Easy to use and easy to teach, this Computer-Aided Design and Drafting system is a powerful, sophisticated entry-level teaching tool. Best of all, it's a real CADD—what students learn in the classroom can be applied in college or on the job.

$49.95. Generic Software, 8763 148th N.E., Building C, Redmond, WA 98052. (800) 228-3601. PRESS.

CIRCLE **101** ON READER SERVICE CARD

ARRAKIS ADVANTAGE SERIES

In conjunction with Arrakis Technologies, Atari has released 17 educational software products that address, enhance and expand math and science-oriented classroom education. The color and graphics of the ST are put to good use by such professional animators as Peter Adamakis, late of Walt Disney Studios. The programs cover algebra, geometry, statistics, trigonometry, biology, chemistry and physics, and are designed for high school students (grades 7-12).

Atari Corp., 1196 Borregas Avenue, Sunnyvale, CA 94086. (408) 745-2000. PRESS.

CIRCLE **102** ON READER SERVICE CARD

METACOMCO BCPL, MAKE

BCPL ($149.95), a popular, powerful programming language, is suitable for applications ranging from systems software to programs to games. Features include: a compiler with full BCPL implementation; separate compilation and macros; linker for program modules written in assembler, BCPL and other high-level languages; libraries providing complete GEM VDI and AES interfaces; text editor; and **Menu+**, $29.95 when sold separately.

Menu+ is an easy-to-use programming environment using pull-down menus and the mouse to control programs, thereby avoiding typing complicated command lines. Users can add their own commands to the menu. Whenever a command is selected from a drop-down menu, the full command is displayed and stored in a history window. It can be re-executed later by double-clicking on the appropriate line in the history.

MetaComCo MAKE ($69.95) accepts a similar syntax to UNIX make and aids program devolopment by automatically recreating files which depend on other files. MAKE maintains any computing project, such as assembly and high-level language programs, and guarantees source and object code integrity by automating the process of compiling, assembling and linking programs.

MetaComCo, 5353E Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-7201. PRESS.

CIRCLE **103** ON READER SERVICE CARD

OSS BAREWARE

Optimized Systems Software's new inexpensive Bareware line of software kicks off with **QuikStart and OverDrive**, a batch processor and RAMdisk package that automatically sets up a RAMdisk and copies files to it. Print, delete, set date and time. **ShortCut**, a desk accessory, allows prnting and copying of files from within other GEM programs. Full source code in Personal Pascal is included.

$20 each. Optimized Systems Software, 1221B Kentwood Avenue, San Jose, CA 95129. (408) 446-3099. PRESS.

CIRCLE **123** ON READER SERVICE CARD

MAXTHINK

Create outlines that expand your thinking processes with this thoroughly-documented idea processor that has been a cult success on the IBM. **MaxThink** features full GEM implementation, word processing, a topic buffer and cut-and-paste. Its quirky 94-page manual teaches you how to think as well as how to operate the program.

$59.95. MaxThink, 230 Crocker, Piedmont, CA 94610. (800) 227-1590. In California, (800) 642-2406. FINAL.

CIRCLE **126** ON READER SERVICE CARD

KUMA FOUR

K-Minstrel (about $45 in English pounds) is an easy-to-use, GEM-driven music composer package yielding professional results with minimum experience and effort. It has a 3,200-chord capacity in four-channel mode. A MIDI interface allows music to be played on four, eight, 12 or 16 channels. A metronome, slurs and triplets are all included.

Stop switching disks so often: **K-Switch** (about $45) saves time and effort by letting you hold two programs in memory simultaneously, but independently. Just switch from one to the other to work on them. The switch takes about a second. A common RAMdisk allows data transfer between the two programs with little effort.

The **K-Word** word processor (about $75) allows four text files open at once, with copy and cut-and-paste facilities within and between those files. Other features include different print fonts shown onscreen, mail-merge and word, line and character counts. A comprehensive printer configuration program and onscreen Help pages are also included.

K-MAX (about $2,200) consists of an add-on box attached to the ST's ROM port. Inside the box is an interface board and a dual process board which can contain two Inmos T414 transputers and two 256K blocks of RAM. Each T414 is a 7.5 MIPS (Million Instructions Per Second), 32-bit RISC (Reduced Instruction Set Computer). Additional features of this keyboard-controlled package include a machine monitor, debugger and disassembler.

Kuma Computers Ltd., 12 Horseshoe Park, Pangbourne, Berkshire RG8 7JW, England. 44-7357-4335. PRESS.

CIRCLE **104** ON READER SERVICE CARD

SMART WATCH

Remove the No. 1 ROM chip from your ST, insert the **Smart Watch**, then plug the ROM back into the Smart Watch socket. Now your ST can run an accurate lithium real-time clock for the next 10 years. Program drivers are included to set and read the Smart Watch, and the read program can be put in the autofolder for automatic operation.

$59.95 for 520ST, $69.95 for 1040ST. Michigan Software, 43345 Grand River, Novi, MI 48050. (313) 348-4477. PRESS.

CIRCLE **105** ON READER SERVICE CARD

LATTICE UNICALC, TEMPLATES

Unicalc spreadsheet ($79.95) allows mouse-pointing for cell-positioning and window-switching, provides a new window environment, including window sizing and repositioning, vertical and horizontal scroll bars and pull-down menus, DIF format read/write capability and enhanced memory management. The **Unicalc Template Pack I** ($39.95) contains more than 30 Unicalc templates for business and personal use.

Lattice Inc., P.O. Box 3072, Glen Ellyn, IL 60138. (312) 858-7950. FINAL.

CIRCLE **106** ON READER SERVICE CARD

ST BASE BBS

This full-featured BBS offers 16 file-transfer and message base areas and a file section similar to CompuServe's, with commands such as Browse, Locate and Read Directory. Features include an online questionnaire, online games, including a Never-Ending Story option, support of XMODEM checksum protocol and XMODEM CRC and up to nine user levels definable by the sysop. **ST Base BBS** supports all RAMdisks and any Hayes modem or compatible.

$50. 1ST Base Software, 48 Amherst Crescent, Nepean, Ontario K2J 1V9, Canada. (613) 825-0400. FINAL.

CIRCLE **107** ON READER SERVICE CARD

AUTOPROGRAM

Create data entry screens of your own design with this fast, practical data management program. Features include a flexible report generator with columnar and summary reports, label printing and more, simple record maintenance, four methods to locate records, automatic indexing and the ability to sort in one field or in all fields at once. Most processing is done in memory.

$59.95. Brainstorm Software, 1760 Potter Road, Park Ridge, IL 60068. FINAL.

CIRCLE **108** ON READER SERVICE CARD

CONVERTER CARTRIDGE

This cartridge, extending only 3/4-inch beyond the computer case, is a general interface for scientific instruments. It has eight analog-to-digital resolution and two digital-to-analog channels, each with +/- 1.25-volt output and 8-bit resolution. Useful wherever electronic signals need to be digitized.

$115. SP Innovations Inc., P.O. Box 33395, North Royalton, OH 44133. (216) 237-2382. PRESS.

CIRCLE **109** ON READER SERVICE CARD

ST COMMAND CENTER

Set up your ST and peripherals with a few button-pushes on one little panel. No more reaching around and straining when you have the ST Command Center. The computer connects to the front of the command center. Monitors, disk drives and modem go on top and the printer goes next to the whole structure, giving you a compact, easily accessible work area.

$79.99. State of the Art Electronics, 4186 North Bend Road, Cincinnati, OH 45211. (513) 385-3312. PRESS.

CIRCLE **110** ON READER SERVICE CARD

ST TOOLS, ST DEMOS

ST Tools I has libraries of more than 60 ST BASIC subroutines—allowing easy incorporation of GEM file selector and dialog boxes, as well as most VDI graphics, into your own ST BASIC programs.

ST Demos I includes six compiled demos for music, games, graphics and utilities, plus the original ST BASIC code. All code is compatible with the LDW BASIC Compiler.

$12.95 each. AccuSoft, P.O. Box 02214, Columbus, OH 43202. (614) 267-3415. PRESS.

CIRCLE **111** ON READER SERVICE CARD

XLENT RELEASES

Typesetter Elite, an upgrade to Typesetter ST, features 960 x 672 resolution printouts even in color, Drag and Copy routines, built-in print preview and ASCII file compatibility. Loads icons anywhere on the screen. **P.M. Interface** helps you create graphics and fonts for Print Master, and **Write 90** prints spreadsheets sideways.

The above products are GEM-based. However, **Mouse Key** lets you use the mouse with non-GEM programs.

XLEnt Software, P.O. Box 5228, Springfield, VA 22150. (703) 644-8881. PRESS.

CIRCLE **112** ON READER SERVICE CARD

WORLD GAMES

A unique departure from Epyx's successful Games series, **World Games** features eight international events, including cliff-diving in Acapulco, barrel-jumping in Germany and Sumo wrestling in Japan. Back home in the United States, you'll ride the meanest bull around.

$39.95. Epyx Inc., 600 Galveston, Redwood City, CA 94063. (415) 366-0606. FINAL.

CIRCLE **113** ON READER SERVICE CARD

WIZARD WARES

ProCharge ($99.95) is an accounts receivable package for those using time units to bill for their services. It lets companies develop complete files of the services performed by staff members. **Julian** ($19.95) eliminates the tedium of date manipulation by converting string dates in any format (mm/dd/yy, mmddyy, etc.) for any century (A.D.) into its unique Julian number.

With **ProA/D** ($29.95), amortization schedules and balloon payments are generated easily. ProA/D gives you printed amortization and depreciation schedules, and supports all major methods of depreciation. **Mouse Medic** ($29.95) lets you make custom mouse images for your own programs and save them to disk. Mouse Medic creates a header file compatible with most C compilers for easy inclusion, and the mouse definition can be used to create sprite images.

FlashBack ($39.95) could be the hard disk backup utility you've been waiting for. It makes use of GEM and lets you speed things up by toggling the Read/Write verify switch. Backs up on standard floppy disks as fast as 26 seconds per 36K of data. **B+C Tree** ($49.95), available for use with MegaMax and Alcyon C, is designed for software developers who need the speed and versatility of C-ISAM. The developer can use either the built-in ISAM data-handling routines, or only the B-Tree key routines and handle data separately. B+C Tree is easy to use, completely documented, and Julian comes free with each purchase.

Mountain Magic Software, Route 1, Box 653, Boone, NC 28607. (704) 264-4021. FINAL.

CIRCLE **114** ON READER SERVICE CARD

DEEP SPACE

Take charge of a STRIX fighter, an advanced long-range raider, and negotiate meteor storms, clear minefields, pluck communications satellites from their orbits, dogfight with Kogons and encounter the awesome Vexon mother ship. These and other adventures await in **Deep Space**.

Psygnosis Ltd., First Floor, Port of Liverpool Building, Pier Head, Liverpool, England L31BY. (051) 236-8818. FINAL.

CIRCLE **115** ON READER SERVICE CARD

*New ST product notices are compiled from information provided by the products' manufacturers. **Antic** assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time, **Antic** had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.*

ST PRODUCT NEWS

ST Reviews

ST STAR RAIDERS
Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000
$29.99
CIRCLE **266** ON READER SERVICE CARD

Reviewed by Gregg Pearlman

You're zooming off in your Starcruiser to fight yet another alien race whose name begins with Z. It's all in a day's work for a seasoned Star Raider. The principle of Atari's joystick-driven **ST Star Raiders** may be no different from its illustrious 8-bit predecessor. But the action and animation are top class, really showing off the power of the ST.



According to the documentation, Star Raiders are the only force in the Atarian Federation strong enough to resist the savage robots, called Zycroids, who are terrorizing the Katsaurii (kATsAuRIi) Quadrant. Your ship's sophisticated panel shows you exactly where to find the Zycroids—most likely near a starbase.

The instrumentation of your ship is fairly involved. Your energy gauge and message window are probably the most important indicators. The target sight tells where your port and starboard ion cannons will hit. The head-up display tracks a selected target and indicates its distance and position. The tactical viewer gives you a galactic map of the Katsaurii Quadrant, a long-range scanner which shows starbases and other ships relative to your own, and an aft scanner so you can see if anyone is on your tail.

On the galactic map, use the arrow keys to move the cursor to an occupied sector, then press [H] to hyperwarp to it. Pressing a number key sets your engine speed. Activate your shields by pressing [S]—very important. Engage the computer with [C], which activates the head-up display and target sight. To track single fighters, fly in the direction of the arrows on the target sight.

The need to protect the starbases is as strong as the need to protect yourself, because the starbases are your only sources of fuel and repairs. And your job, basically, is to destroy every Zycroid robot you see.

The Zycroids will constantly fire upon your ship. If you keep your shields up, though, you won't be dreadfully disabled—at least at the lower difficulty levels. There are seven kinds of Zycroid, ranging from the spherical WebStar, which basically sits in your sights and waits to be hit, to the Subtractor and Demon, which really play for blood.

The difficulty levels are Novice, Pilot, Warrior and Commander. As the level increases, types of Zycroids vary, your susceptibility to damage increases and you'll have more starbases to protect—and less time to protect them when they're under attack.

The table below clearly indicates the rising levels of difficulty involved. To work out a "difficulty factor" for each level I multiplied the number of Zycroid types by the amount of starbases needing protection, then dividing this by the minutes given to save a surrounded base.

Level	Zycroid Types	×	Star Bases	÷	Save Within	=	Difficulty Factor
Novice	2		3		2		3
Pilot	4		4		1.5		10.67
Warrior	7		5		1		35
Commander	7		6		0.5		84

The Commander level might not *really* be 28 times as hard as Novice, but it sure seems that way.

The game ends, of course, if you're destroyed. It also ends, however, if you vanquish the entire Zycroid force in the quadrant, and you're given the rank of Rookie, Novice, Lieutenant, Pilot, Ace, Warrior, Centurion, Commander or Star Commander— and a class of 1 (highest) to 4. You are also

classified if you get destroyed, but your rank will be Garbage Scow Captain. Note that the *rank* of Pilot is not the same as the Pilot *level.*

ST Star Raiders is more than just visually enticing. It's as entertaining to watch as to play. The graphics are smooth and colorful and the sound effects are "aurally enticing." Most of the sounds are what you'd expect, but hyperwarp sounds like tap water going into a plastic cup.

A strange quirk in the game is the way it sometimes seemed to engage the hyperwarp drive, put the game on pause, and even activate (or deactivate) the computer or deflector shields spontaneously.

Other than that, the only problem with ST Star Raiders is that since the original 8-bit Star Raiders first appeared, the space shoot-em-up has been done almost to death. But at least the genre is still fun when it's represented by a game as good as ST Star Raiders.

THE ANIMATOR
MichTron
576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700
$39.95
CIRCLE **260** ON READER SERVICE CARD

Reviewed by Michael Nowicki

This interesting graphics program lets you take low-resolution color designs created with NEOchrome, DEGAS, or almost any other ST drawing program and make them move. A full-screen drawing used as the background is automatically duplicated in memory for page-flipping. Don't worry if you don't have the time or artistic talent to produce your own masterpiece—hundreds of public domain pictures can be downloaded from bulletin boards or acquired from user groups.

You first design the objects that will move in the background. An object can have 16 colors, and parts of objects can be isolated for special treatment. Objects can be assigned to one of 256 depth levels, so they can cross over and under each other realistically. The base color of an object can be changed at will, for some interesting effects when objects with holes are combined. This feature also allows for the economy of design effort that is so essential in animation.

Make your NEOchrome and DEGAS designs move

For instance, if you want four armies marching on the screen, you can easily draw one torso and have other cells showing marching feet and swinging arms, and you can also control the color for each army's uniform.

The Animator is really three short programs. The first one reads the pictures created with your drawing program and cuts the images and masks them into an orderly format for animation processing, saving the information as a disk file. The maximum size for objects appears to be about 65 pixels wide by 190 pixels high.

The second program reads this file so you can view each object and write a program controlling the graphic movie. Firmly seated in your director's chair, you create a series of "frames" which, when rapidly viewed, create the illusion of motion, like frames of film.

A simple four-command language is used to place objects on the screen, create a loop to repeat a sequence, call a subroutine and return from it. The program is entered and edited with an onscreen text editor, but can be printed out only at the end of the session.

The third program runs the animation movie you just created with a variable speed from 30 frames per second to one frame every two seconds.

The documentation consists of a technically accurate 36-page manual geared toward readers who already have a sound footing in both animation technique and programming logic. New computer users are likely to be snowed by the presentation. The manual seems to have been written by a programmer who knows the program inside and out. But he should have explained more clearly and included a tutorial section.

Even the four-command language was hard to grasp because the manual gives no hard examples of syntax, structure or programming philosophy. You are forced to deduce these factors from the demo file.

The program disk is not copy-protected, has but it has weird, partially formatted tracks preventing you from making a routine disk-to-disk copy. Instead, you must copy the files one by one to your backup disk. The manual does tell you to copy files individually, but it doesn't say you can't copy the entire disk using normal procedures. At first I thought my ST had gone bonkers until I examined the disk with a sector editor and saw what was going on.

Included on the disk is the assembly source code file for Animator and a text file detailing the inner secrets and disk-file format for use in your own programs. One version is provided for floppy disks, another for hard drives.

I took a public domain picture of a view from the surface of an alien world, looking up at other worlds in the sky. I erased everthing except the worlds and a few stars and made them move. On the original picture, which I used for the background, I removed the planets and filled the gaps with black space and more stars. Before long I had the planets rising and setting over the horizon of the alien world, producing satisfactory results in about two hours.

One severe limitation of the program is that smooth horizontal scrolling of an image is impossible because only 20 positions are available, creating jerky, flickering movements. Vertical motion looks much better.

When people think of animation, some think of Bugs Bunny, Mickey Mouse or the computer-created scenes used by the TV networks. The

continued on next page

Animator can't do this very well. The results look more like arcade games. This is partially due to the low-res 320-by-200 mode you must use. It's very colorful, but the resolution isn't great, giving it an 8-bit appearance on the ST.

If the manual were simplified, the Animator would have tremendous appeal to entry-level ST users who want the fun of bringing their computer pictures to life.

MACRO MANAGER
Shanner International Corp.
453 Ravendale Drive
Mountain View, CA 94043
(415) 964-2992
$69.95
CIRCLE 255 ON READER SERVICE CARD

Reviewed by Steve Dimeo

MacroManager is a 70K "Sidekick" type of desk accessory that lists the following features: 20-function calculator with 10 memories; card-file database storage (limited only by disk memory) with user-friendly search, print and automatic phone dialing; alarm clock/calendar; weekly planner that can order the alarm to signal important times or days; time accounting report generator; electronic note pad that functions as a simple word processor recording up to four pages of word-wrapped data; and electronic typewriter emulator.

The most useful of these is probably the card file. The form offers blank lines for the name, phone number, address or other information. Entries are automatically filed alphabetically by name. They can also be found, replaced or removed with a simple click of the mouse. Names can be printed either with phone numbers, addresses or both.

The 20-function calculator is impressive in its abilities to determine sines and cosines as well as compute amortization of loans into monthly rates. In describing the calculator's many algebraic functions, by the way, the otherwise clear, well-organized documentation becomes a bit murky.

As for the alarm clock function, I question its usefulness. What if the computer is turned off when the alarm goes off? Wouldn't users be better off relying on a digital alarm watch for time and alarms?

The weekly planner allows only five lines per day to list appointments or things to do, and that wasn't enough for me. Each line is separate and limited in characters, and there's no word-wrap. The cursor must be clicked down to each respective line, or else the excess characters will be typed right into computer heaven.

Although the electronic note pad and typewriter do allow word-wrap, the note pad's messages can't be saved into memory. The typewriter mode allows one line of memory before words are committed to the printer. It could be valuable for filling out forms or typing envelopes.

As with any grab-bag of accessory features, some of what you find in MacroManager may be quite useful to you while other functions are of no use in meeting your needs.



"Don't even think about another C compiler"

- Mike Fleischman, ANTIC: The Atari Resource, Sept. 1986

Megamax Professional C Development System For The Atari ST
Rated #1 C compiler by ANTIC, Compute!'s Atari ST, and Start: The ST Quarterly

- Full Kernighan and Ritchie implementation
- Single pass compilation
- Full access to GEM routines
- Graphical shell
- Intelligent Linker produces efficient native code
- Extensive documentation
- Disassembler
- C programmer's editor
- Code improver
- Developer support included
- Resource construction program
- Create desk accessories
- In-line assembly and structure passing
- Object file librarian
- Six times faster than Atari Development Package
- Develop on single drive 520 ST
- The compiler chosen for development by:
  Batteries Included
  FTL Games
  Supra Corp.

$199.95
Mastercard, VISA, American Express & C.O.D. accepted

Megamax
Development Systems

Megamax, Inc. • Box 851521
Richardson, TX 75085
(214) 987-4931

CIRCLE 043 ON READER SERVICE CARD

SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher.

Antic program listings are typeset on the Star's SB-10 printer—from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ

ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz

abcdefghijklmnopqrstuvwxyz

0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL S
	CTRL A		CTRL T
	CTRL B		CTRL U
	CTRL C		CTRL V
	CTRL D		CTRL W
	CTRL E		CTRL X
	CTRL F		CTRL Y
	CTRL G		CTRL Z
	CTRL H		ESC ESC
	CTRL I		ESC CTRL −
	CTRL J		ESC CTRL =
	CTRL K		ESC CTRL +
	CTRL L		ESC CTRL *
	CTRL M		CTRL .
	CTRL N		CTRL ;
	CTRL O		CTRL =
	CTRL P		ESC SHIFT CLEAR
	CTRL Q		ESC DELETE
	CTRL R		ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL X
	CTRL A		CTRL Y
	CTRL B		CTRL Z
	CTRL C		ESC SHIFT CLEAR
	CTRL D		ESC SHIFT INSERT
	CTRL E		ESC CTRL TAB
	CTRL F		ESC SHIFT TAB
	CTRL G		CTRL .
	CTRL H		CTRL ;
	CTRL I		SHIFT
	CTRL J		ESC CTRL 2
	CTRL K		ESC CTRL DELETE
	CTRL L		ESC CTRL INSERT
	CTRL M		
	CTRL N		
	CTRL O		
	CTRL P		
	CTRL Q		
	CTRL R		
	CTRL S		
	CTRL T		
	CTRL U		
	CTRL V		
	CTRL W		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL		STANDARD	
	CTRL F	/	/
	CTRL G	\	SHIFT +
	CTRL N	_	SHIFT −
	CTRL R	−	−
	CTRL S	+	+

HOW TO USE TYPO II (8-BIT)

TYPO II automatically proofreads **Antic**'s type-in BASIC listings for 8-bit Atari computers. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at the left of the line number. Press the [RETURN] key.

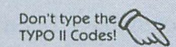
Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME"[RETURN](Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

LISTING 1




```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPO II "

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "K":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

ERROR FILE

SSSNAKE!!!

Sssnake!!! (October, 1986) tends to crash after about 10 minutes under certain conditions of play. If you're one of the people who have gotten the message "Error 13 at 571," you can fix the listing by substituting the following two lines.

```
MX 570 F51=F51-N*(F51>N):IF F51<>N THEN 5
   75
MY 571 POKE VVD,PUR:FOR I=N TO 200:POKE V
   F,I:POKE VF,I+TN:POKE BLF,I:NEXT I:GOT
   O 2000
```

WEFAX SOURCES

Radio Shack discontinued the XR2211 chip specified for the WEFAX Interface Board (September, 1986). The XR2211 is a generic chip that can be found at a number of large electronics suppliers and mail-order dealers.

FILE MASTER

Disk subscribers should load *File Master* (August, 1986) from DOS and copy it to another disk. It does not RUN properly from the monthly disk menu.

If you have the *File Master* lockup problem that occurs under some combinations of DOS's and disk drives, change the 100 in line 2625 to a 90.

MICRO JULIUS

For some dates, *Micro Julius* (June, 1986) puts in the wrong day of the week. To cure this, type in the following one-line fix:

```
WF 830 DIF=(DOW-D)/7:DIF=2*INT(7*(DIF-INT
   (DIF))+0.5)+1
```

HOW TO USE TYPO ST

TYPO ST is the automatic proofreading program for checking **Antic's** ST BASIC type-in listings. It finds any program line where you made a typing mistake.

Type in TYPO ST and SAVE a copy to disk before you RUN it. Now type RUN in the command window and press the [RETURN] key, or click on RUN from the RUN menu.

TYPO ST first asks for the name of the file to check. Type the desired filename and press [RETURN]. (TYPO ST will proofread itself if you type TYPOST.BAS as the filename.) Next, TYPO ST asks where you want the TYPO table printed. Type [S] [RETURN] for Screen, or [P] [RETURN] for Printer.

TYPO ST now reads your ST BASIC program and prints out a table of four-number codes—and the line number for each code. Compare your printed TYPO ST table with the **Antic** TYPO ST table published at the end of the program you are checking. If any of your four-number codes don't match the magazine's codes, you have made a typing mistake somewhere in that line. Carefully recheck your line against the published version.

Antic uses a word processor to format ST BASIC listings for publication, so we can indent lines and make the program structure more understandable. ST BASIC doesn't allow indentation and will strip off any spaces between the line number and the first BASIC instruction. Therefore, TYPO ST ignores space characters and does not care how far instructions are spaced apart.

TYPO ST cannot determine if two different characters have been switched within a line. For example, PRINT and PRNIT will look the same to TYPO ST. However, ST BASIC itself catches this error and points it out to you.

```
1000   ' TYPO/ST, (c) 1986 Antic Publishing, by Bill Marquardt
1010    DISK=1: OUTPUT=2: TRUE=(-1): FALSE=0: CHECKSUMMING=TRUE
1020    TV=FALSE: PRINTER=FALSE
1030    print "File to Check:": input FILENAME$: print "Output on:"
1040    print "(S)creen or ": print "(P)rinter ": input DEVICE$
1050    if( DEVICE$="p" )or( DEVICE$="P" )then PRINTER=TRUE else TV=TRUE
1060    if TV then print "Checksum for file: ": print FILENAME$: print
1070    if PRINTER then lprint "Checksum for file: ";FILENAME$: lprint
1080    open "I", #DISK, FILENAME$
1090    while CHECKSUMMING
1100       LINENUMBER=0: CHECKSUM=0: gosub GETALINE
1110       DECIMAL=CHECKSUM: gosub DECTOHEX
1120       OUTPUT$=str$( LINENUMBER )+" :"+HI$+LO$
1130       if PRINTER then lprint OUTPUT$ else print OUTPUT$
1140    wend
1150    close DISK
1160   end
1170   GETALINE:
1180    BLINE$="": on error goto 1150
1190    GOTALINE=FALSE
1200    while not GOTALINE
1210       line input#DISK, BLINE$: if len( BLINE$ )>1 then GOTALINE=TRUE
1220    wend
1230    LINENUMBER=val( BLINE$ )
1240    for CHAR=1 to len( BLINE$ )
1250       OK=TRUE: CHARACTER$=mid$( BLINE$, CHAR, 1 )
1260       if CHARACTER$=" " then OK=FALSE
1270       if OK then CHECKSUM=CHECKSUM+asc( CHARACTER$+chr$( 0 ))
1280    next CHAR
1290   return
1300   DECTOHEX:
1310    DECIMAL=abs( DECIMAL )
1320    HI=int( DECIMAL/256 ): LO=( DECIMAL-( HI*256 ))
1330    HH=int( HI/16 ): HL=( HI-( HH*16 ))
1340    LH=int( LO/16 ): LL=( LO-( LH*16 ))
1350    HI$=chr$( 48+HH-( 7*( HH>9 )))+chr$( 48+HL-( 7*( HL>9 )))
1360    LO$=chr$( 48+LH-( 7*( LH>9 )))+chr$( 48+LL-( 7*( LL>9 )))
1370   return
```

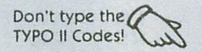
1000 :110B	1060 :13E7	1120 :0A48	1180 :089A	1240 :079B	1300 :0352	1360 :0C29
1010 :0EA2	1070 :140E	1130 :1000	1190 :04C6	1250 :0AEB	1310 :0667	1370 :036B
1020 :071B	1080 :0713	1140 :0274	1200 :0680	1260 :08BB	1320 :0B13	
1030 :12D2	1090 :0661	1150 :0408	1210 :11B9	1270 :0F36	1330 :07E3	
1040 :10E6	1100 :0BBD	1160 :01FF	1220 :0273	1280 :03A8	1340 :0804	
1050 :11A2	1110 :09F0	1170 :034C	1230 :0716	1290 :036C	1350 :0C0E	

learn arithmetic in a flash

MATH ATTACK

Article on page 29

LISTING 1

Don't type the TYPO II Codes! 

```
FF 10 REM MATH ATTACK
JQ 20 REM BY RALPH B. DAVIS SR.
GL 30 REM (c) 1986, ANTIC PUBLISHING
ON 32 BRK=1:IF PEEK(53279)=5 THEN BRK=0
SR 33 GOTO 40
JD 35 POKE 77,0:IF BRK THEN POKE 16,112:P
   OKE 53774,112
AF 36 RETURN
PV 40 DIM A$(20),B$(20),C$(1),W$(1),DIV$(
   12)
VL 50 GOSUB 2060:REM MAIN TITLE
ND 60 GOSUB 800:REM GRAPHICS
KO 70 GOSUB 1930:REM TITLE SCREEN
XF 80 GOSUB 890:REM SET UP
NG 85 GOTO 2560
NG 90 GOSUB 800:REM GRAPHICS
UV 100 Y=INT(RND(1)*(HT-LT+1))+LT
WE 110 X=INT(RND(1)*(HB-LB+1))+LB
DI 115 IF CT=4 AND X*Y=0 THEN 100
BZ 120 ON CT GOTO 130,140,160,170
EW 130 POSITION 6,5:? #6;"+":POSITION 2,1
   :? #6;"   addition    ":W=X+Y:GOTO 180
ML 140 IF X>Y THEN 100
YB 150 POSITION 6,5:? #6;"-":POSITION 2,1
   :? #6;"  subtraction ":W=Y-X:GOTO 180
WZ 160 POSITION 6,5:? #6;"X":POSITION 2,1
   :? #6;"multiplication":W=X*Y:GOTO 180
YR 170 POSITION 2,1:? #6;"   DIVISION   "
   :POSITION 2,11:? #6;"OPTION TO EXIT":D
   IV=X*Y:GOSUB 1680:GOTO 260
JK 180 POSITION 2,11:? #6;"OPTION TO EXIT
   "
HD 190 IF Y>9 THEN POSITION 8,3:? #6;Y:GO
   TO 210
ER 200 POSITION 9,3:? #6;Y
ZQ 210 IF Y>99 AND X<10 THEN POSITION 10,
   5:? #6;X:GOTO 250
TG 220 IF Y>99 AND X<99 THEN POSITION 9,5
   :? #6;X:GOTO 250
NV 230 IF X>9 THEN POSITION 8,5:? #6;X:GO
   TO 250
FI 240 POSITION 9,5:? #6;X
VZ 250 POSITION 8,6:? #6;"  "
RO 260 FOR T=1 TO OUT
JP 270 IF PEEK(53279)=3 THEN GOTO 1400
OO 280 NEXT T:GOSUB 780
RF 290 IF CT=4 THEN POSITION 8,4:? #6;X:G
   OTO 350
LC 300 IF W<10 THEN POSITION 9,7:? #6;W:G
   OTO 350
ZP 310 IF W>99 AND X>9 AND X<100 AND Y>9
   AND Y<100 THEN POSITION 7,7:? #6;W:POS
   ITION 7,6:? #6;" ":GOTO 350
FQ 320 IF W<100 THEN POSITION 8,7:? #6;W:
   POSITION 10,6:? #6;" ":GOTO 350
HL 330 IF W>99 THEN POSITION 8,7:? #6;W:P
   OSITION 10,6:? #6;" ":GOTO 350
FE 340 POSITION 8,7:? #6;W
FE 350 FOR T=1 TO 1000:NEXT T
SK 360 GOSUB 800:GOTO 90
FR 370 OUT=TIME*50
UA 380 FOR ZT=1 TO 10
NU 390 GOSUB 830:TM=0
MG 400 POSITION 3,1:? #6;" now testing "
ZZ 410 POSITION 1,3:? #6;"NO.";ZT
VC 420 Y=INT(RND(1)*(HT-LT+1))+LT
WL 430 X=INT(RND(1)*(HB-LB+1))+LB
JB 435 IF CT=4 AND X*Y=0 THEN 420
TM 440 ON CT GOTO 450,460,480,490
FD 450 POSITION 6,6:? #6;"+":W=X+Y:GOTO 5
   00
QB 460 IF X>Y THEN 420
JJ 470 POSITION 6,6:? #6;"-":W=Y-X:GOTO 5
   00
TT 480 POSITION 6,6:? #6;"X":W=X*Y:GOTO 5
   00
KI 490 DIV=Y*X:GOSUB 1690:GOTO 570
PG 500 IF Y>9 THEN POSITION 8,5:? #6;Y:GO
   TO 520
GC 510 POSITION 9,5:? #6;Y
LA 520 IF Y>99 AND X<10 THEN POSITION 10,
   7:? #6;X:GOTO 560
EK 530 IF Y>99 AND X<99 THEN POSITION 9,7
   :? #6;X:GOTO 560
WR 540 IF X>9 THEN POSITION 8,7:? #6;X:GO
   TO 560
GT 550 POSITION 9,7:? #6;X
QE 560 POSITION 8,8:? #6;"__"
HZ 570 POKE 752,1:? :? :POSITION 22,2:? "
    ENTER ANSWER "
ZO 580 IF TIM=2 THEN 610
XD 590 POKE 764,255
RJ 600 IF PEEK(764)=255 THEN 1780
DK 610 TRAP 640:INPUT ANS:? :? :? :?
AX 620 IF CT=4 AND ANS=X THEN 660
VC 630 IF CT<>4 AND ANS=W THEN 660
WK 640 POSITION 11,3:? #6;" wrong !":GOSU
   B 840:GOSUB 790:GOSUB 820:NEXT ZT:GOTO
    670
DH 650 GOSUB 790:GOSUB 840:GOSUB 820:NEXT
    ZT:GOTO 670
GD 660 POSITION 10,3:? #6;" correct !":GO
   SUB 840:GOSUB 792:SC=SC+1:NEXT ZT:GOTO
    670
VO 670 GOSUB 830
XG 680 SCORE=SC*10
NG 690 IF SCORE<70 THEN POSITION 3,3:? #6
   ;"better study":GOTO 730
VQ 700 IF SCORE<90 THEN POSITION 3,3:? #6
   ;"not bad !!!!":GOTO 730
QJ 710 IF SCORE=90 THEN POSITION 3,3:? #6
   ;"very good!!!":GOTO 730
FP 720 IF SCORE=100 THEN 750
JH 730 POSITION 7,5:? #6;"Score":POSITION
    8,7:? #6;SCORE;"%"
CO 740 GOSUB 810:SC=0:GRAPHICS 0:GOTO 140
   0
HL 750 FOR GT=1 TO 3
HF 760 POSITION 3,3:? #6;"              ":G
   OSUB 780
AC 770 POSITION 3,3:? #6;"H! Great H!H":G
   OSUB 792:NEXT GT:GOTO 730
SA 780 SOUND 0,1,6,10:FOR T=1 TO 10:NEXT
   T:SOUND 0,0,0,0:RETURN
QL 790 POKE 708,PEEK(711):FOR T=30 TO 0 S
   TEP -1:SOUND 0,50,6,T/2:SOUND 1,10,12,
   T/2:POKE 711,PEEK(20)
FS 791 NEXT T:POKE 711,PEEK(708):RETURN
KT 792 FOR T=-2 TO 23:VOL=((ABS(T)>0)*(T<
   20))*14:POKE 711,PEEK(53770)
CI 793 SOUND 0,60,14,VOL:SOUND 1,47,14,VO
   L:SOUND 2,40,14,VOL:SOUND 3,29,14,VOL:
   NEXT T:RETURN
GQ 800 GRAPHICS 18:GOSUB 35:POKE 711,152:
   COLOR 2:RETURN
MI 810 FOR T=1 TO 800:NEXT T:RETURN
IS 820 FOR T=1 TO 200:NEXT T:RETURN
KH 830 GRAPHICS 2:GOSUB 35:POKE 712,112:P
   OKE 710,112:RETURN
HH 840 IF CT=4 THEN POSITION 9,4:? #6;X:R
   ETURN
DC 850 IF W<10 THEN POSITION 9,9:? #6;W:R
   ETURN
BM 860 IF W<100 THEN POSITION 8,9:? #6;W:
   RETURN
QY 870 IF X>99 OR Y>99 THEN POSITION 8,9:
   ? #6;W:RETURN
```

continued on next page

```
VZ 880 POSITION 7,9:? #6;W:RETURN
BA 890 GRAPHICS 0:POKE 712,66:POKE 710,14
4
RV 900 GOSUB 35:ON CT GOTO 910,920,930,94
0
TB 910 POSITION 9,1:? " SETTING UP ADDITI
ON ":GOTO 950
OB 920 POSITION 8,1:? " SETTING UP SUBTRA
CTION ":GOTO 950
IL 930 POSITION 6,1:? " SETTING UP MULTIP
LICATION ":GOTO 950
PP 940 POSITION 5,1:? " SETTING UP INTEGE
R DIVISION  ":GOSUB 1610:GOTO 1020
PT 950 POSITION 12,3:? "TOP NO. ⊟> "
YZ 960 POSITION 9,5:? "BOTTOM NO. "
FU 970 POSITION 23,6:? "___ "
RL 980 POSITION 3,9:? "To play MATH ATTAC
K, you must first  type in the range o
f the TOP number."
CN 990 ? "Next, type in the range of the
BOTTOM number."
PD 1000 ? "I'll use numbers which fall wi
thin":? "these ranges to create math q
uestions for you."
DS 1010 POSITION 2,16:? " Then I'll let y
ou select how much":? "time you'll hav
e to answer each one."
EW 1020 DIV$=" TOP NO. ":IF CT=4 THEN DIV
$=" DIVISOR  "
OT 1025 POSITION 2,19:? " ENTER  LOW SIDE
 OF ";DIV$:GOSUB 1600:TAP=1
ND 1030 TRAP 1020:POSITION 2,20:? "←←←":I
NPUT LT:TRAP 1560
VW 1035 IF CT=4 THEN IF LT=0 OR LT<>INT(L
T) THEN GOSUB 3000:GOTO 1025
PL 1040 IF CT=4 THEN POSITION 12,4:? LT;"
-":GOTO 1060
YA 1050 POSITION 23,3:? LT;" -       "
LD 1060 POSITION 2,19:? " ENTER  HIGH SID
E OF ";DIV$:TAP=2:GOSUB 1600
LR 1070 TRAP 1040:POSITION 6,20:? "←←←":I
NPUT HT:TRAP 1560
FU 1075 IF CT=4 THEN IF HT=0 OR HT<>INT(H
T) THEN GOSUB 3000:GOTO 1060
HP 1080 IF CT=4 THEN POSITION 12,4:? LT;"
-";HT:GOTO 1100
DI 1090 POSITION 23,3:? LT;" - ";HT
DQ 1100 IF HT<LT THEN GOSUB 1750:GOTO 106
0
MI 1110 IF CT=4 THEN POSITION 31,3:? "<⊟"
:POSITION 8,5:? "  ":GOTO 1130
TK 1120 POSITION 20,5:? "⊟>":POSITION 20,
3:? "  "
LG 1130 DIV$=" BOTTOM NO. ":IF CT=4 THEN
DIV$=" QUOTIENT  "
GL 1135 POSITION 2,19:? " ENTER  LOW SIDE
 OF ";DIV$:TAP=3:GOSUB 1600
ID 1140 TRAP 1110:POSITION 2,20:? "←←←":I
NPUT LB:TRAP 1560
OQ 1145 IF CT=4 THEN IF LB=0 OR LB<>INT(L
B) THEN GOSUB 3000:GOTO 1135
GE 1150 IF CT=2 THEN 1170
RU 1160 GOTO 1180
CG 1170 IF LB>HT THEN 1570
JG 1180 IF CT=4 THEN POSITION 23,2:? LB;"
-":GOTO 1200
KA 1190 POSITION 23,5:? LB;" -       "
OV 1200 POSITION 2,19:? " ENTER  HIGH SID
E OF ";DIV$:TAP=4:GOSUB 1600
FR 1210 TRAP 1180:POSITION 2,21:? "←←←":I
NPUT HB:TRAP 1560
II 1212 IF CT=4 THEN IF HB=0 OR HB<>INT(H
B) THEN GOSUB 3000:GOTO 1200
EC 1215 IF CT=2 THEN 1230
PW 1220 GOTO 1240
AM 1230 IF HB>HT THEN 1570
RN 1240 POKE 752,1:POSITION 2,19:? "
    "
WM 1250 IF CT=4 THEN POSITION 23,2:? LB;"
-";HB:GOTO 1280
SL 1260 POSITION 23,5:? LB;" - ";HB
IR 1270 IF HB<LB THEN GOSUB 1750:GOTO 120
0
ZZ 1280 GOSUB 820
KO 1290 POKE 712,66:POKE 710,144:POKE 752
,0:? "K":? :? "      NOW SELECT SPEED "
HB 1300 ? :? "This is length of time I gi
ve you":? "to think about the problem.
"
AU 1310 ? :? "When the time runs out,":?
"I'll tell you the correct answer."
```

```
XP 1320 TIME=0:OUT=0:TAP=5
RT 1330 ? :? :? " Choose speed (1 - 10)"
WL 1340 ? :? "    1 =  FAST "
XH 1350 ? :? "   10 =  SLOW "
LY 1360 ? :? "How fast are  YOU? ":GOSUB
1770
VY 1370 TRAP 1360:POSITION 2,19:? "←←";:I
NPUT TIME:OUT=TIME*100
ZL 1375 IF TIME<1 OR TIME>10 THEN GOSUB 7
90:GOTO 1360
BD 1380 RETURN
TC 1390 REM RETURN CHOICE
JV 1400 ? "K":POKE 712,66:POKE 710,144:?
:? :? :POKE 752,1
LK 1410 ? :? "           PRESS"
NS 1420 ? :? "       R  TO  RESET TIME "
GA 1430 ? :? "       C  TO  CHANGE INPUT
 NOS. "
PO 1440 ? :? "       T  TO  TAKE TEST "
DH 1450 ? :? "       N  TO  NEW MATH "
PJ 1460 POKE 752,1
ZG 1470 CLOSE #1:OPEN #1,4,0,"K:":GOSUB 3
5
JH 1480 GET #1,N
UG 1490 B$=CHR$(N):CLOSE #1
OE 1500 POKE 752,0
BI 1510 IF B$="R" OR B$="r" THEN GOSUB 12
90:GOTO 2560
IT 1520 IF B$="T" OR B$="t" THEN 1830
UG 1530 IF B$="C" OR B$="c" THEN GOSUB 89
0:GOTO 2560
ZL 1540 IF B$="N" OR B$="n" THEN STOP :GO
SUB 2070:GOSUB 890:GOTO 2560
SJ 1550 GOTO 1460
SL 1560 GOSUB 1750:ON TAP GOTO 1020,1060,
1130,1200,1370
LJ 1570 POSITION 6,21:? "NUMBER MUST BE S
MALLER !":GOSUB 780:GOSUB 820:POSITION
 6,21:? "                        "
JG 1580 IF TAP=4 THEN 1200
PY 1590 GOTO 1130
BG 1600 POSITION 2,21:? "           ":RETURN
LL 1610 POSITION 11,4:? "          ⁄▔▔▔▔▔▔
▔▔":REM CTRL-F, CTRL-M
DP 1620 POSITION 22,3:? "QUOTIENT"
PK 1630 POSITION 8,5:? "⊟> DIVISOR ⁄ DIVI
DEND"
JA 1640 POSITION 18,6:? "⁄":REM CTRL-F
NO 1650 POSITION 2,9:? " FIRST  Enter the
 range of the  DIVISOR "
PN 1660 POSITION 2,12:? " THEN  Enter the
 range of the  QUOTIENT "
MX 1670 POSITION 2,15:? "THEN I will let
you SELECT how much   TIME you need":R
ETURN
GT 1680 POSITION 8,5:? #6;"▬▬▬▬▬▬":POSITI
ON 5,8:? #6;"⁄":POSITION 6,7:? #6;"⁄":
POSITION 7,6:? #6;"⁄":GOTO 1700
YM 1690 POSITION 8,5:? #6;"______":POSITI
ON 5,8:? #6;"/":POSITION 6,7:? #6;"/":
POSITION 7,6:? #6;"/"
ZG 1700 IF Y<10 THEN POSITION 4,6:? #6;Y:
GOTO 1730
BW 1710 IF Y<100 THEN POSITION 3,6:? #6;Y
:GOTO 1730
GH 1720 POSITION 1,7:? #6;Y
RG 1730 POSITION 8,7:? #6;DIV
AZ 1740 RETURN
ES 1750 POSITION 6,21:? "NUMBER MUST BE L
ARGER !":GOSUB 780:GOSUB 820:POSITION
6,21:? "                        "
BF 1760 RETURN
HZ 1770 FOR FL=1 TO 5:POKE 755,0:FOR T=1
TO 5:NEXT T:POKE 755,2:NEXT FL:RETURN
CN 1780 TM=TM+1
ZS 1790 IF TM=OUT THEN 1810
PL 1800 GOTO 600
DY 1810 IF CT=4 THEN POSITION 11,8:? #6;"
times":POSITION 12,9:? #6;"up !":TM=0:
GOTO 650
CF 1820 POSITION 12,5:? #6;"times":POSITI
ON 14,7:? #6;"up !":TM=0:GOTO 650
JU 1830 POKE 752,1:? "K":POKE 712,52:? :?
:? "        READY TO TAKE TEST "
JW 1840 ? :? :? " I'LL NOW GIVE YOU 10 P
ROBLEMS,       YOU'RE TO FILL IN THE CO
RRECT ANSWERS  THEN I WILL GRADE YOU."
TL 1850 ? :? :? "PRESS  START  TO BEGIN."
OB 1860 POSITION 5,14:? "PRESS  SELECT  F
OR TIMER":POSITION 9,16:? "TIMER  ON 
"
```

```
DB 1870 IF PEEK(53279)=5 THEN TIM=TIM+1:I
   F TIM=3 THEN TIM=1
HV 1880 IF TIM=2 THEN POSITION 15,16:? "■
   OFF■"
NB 1890 IF TIM=1 THEN POSITION 15,16:? "■
   ON■ "
WR 1900 IF PEEK(53279)=6 THEN 370
GT 1910 FOR XT5=1 TO 12:NEXT XT5:GOTO 187
   0
NP 1920 REM TITLE SCREEN
DB 1930 GOSUB 35:ON CT GOTO 1940,1950,196
   0,1970
VH 1940 POSITION 4,5:? #6;"  ADDITION  ":
   C$="+":W$="■":GOTO 1980
ML 1950 POSITION 3,5:? #6;" SUBTRACTION "
   :C$="-":W$="■":GOTO 1980
AP 1960 POSITION 3,5:? #6;"MULTIPLICATION
   ":C$="x":W$="■":GOTO 1980
KM 1970 POSITION 3,5:? #6;"    DIVISION
   ":C$="%":W$="■":GOTO 1980
TO 1980 COLOR ASC(W$):PLOT 1,1:DRAWTO 18,
   1:DRAWTO 18,10:DRAWTO 1,10:DRAWTO 1,1
MM 1990 REM COLORS
SG 2000 FOR VV=2 TO 18 STEP 2:POSITION VV
   ,1:? #6;C$:GOSUB 780:NEXT VV:FOR BB=2
   TO 10 STEP 2:POSITION 18,BB:? #6;C$
UG 2010 GOSUB 780:NEXT BB
ZH 2020 FOR VC=18 TO 1 STEP -2:POSITION V
   C,10:? #6;C$:GOSUB 780:NEXT VC:FOR VB=
   10 TO 1 STEP -2
NJ 2030 POSITION 1,VB:? #6;C$:GOSUB 780:N
   EXT VB:GOSUB 820:RETURN
NH 2050 REM TITLE SCREEN
HV 2060 GOSUB 2330:REM MAIN TITLE
QY 2070 GRAPHICS 0:GOSUB 2550
ZV 2080 GOSUB 2310
LN 2090 POSITION 3,6:? #6;"1. + add +"
BF 2100 POSITION 3,9:? #6;"2. - subtract
   -"
ES 2110 POSITION 3,12:? #6;"3. X multiply
   X"
EY 2120 POSITION 3,15:? #6;"4. % divide %
   "
KV 2130 FOR HJ=1 TO 4:GOSUB 2320:GOSUB 25
   40:GOSUB 2310:NEXT HJ
HZ 2140 CLOSE #1:OPEN #1,4,0,"K:"
IT 2150 GET #1,N
WU 2160 A$=CHR$(N)
NH 2170 CLOSE #1
TK 2180 IF A$="1" THEN CT=1:GOSUB 2270:GO
   TO 2230
WG 2190 IF A$="2" THEN CT=2:GOSUB 2280:GO
   TO 2230
YA 2200 IF A$="3" THEN CT=3:GOSUB 2290:GO
   TO 2230
PB 2210 IF A$="4" THEN CT=4:GOSUB 2300:GO
   TO 2230
PW 2220 GOTO 2140
QN 2230 FOR P=1 TO 5:POSITION 3,20:? #6;"
            ":GOSUB 2540:POSITION 3,20:
   ? #6;"PRESS START":NEXT P
YL 2240 IF PEEK(53279)=6 THEN RETURN
WK 2250 IF PEEK(53279)=5 THEN POSITION 3,
   20:? #6;"               ":GOTO 2080
QU 2260 GOTO 2240
DY 2270 POSITION 8,6:? #6;"ADD":RETURN
QL 2280 POSITION 8,9:? #6;"SUBTRACT":RETU
   RN
EF 2290 POSITION 8,12:? #6;"MULTIPLY":RET
   URN
IJ 2300 POSITION 8,15:? #6;"DIVIDE ":RETU
   RN
RW 2310 POSITION 5,2:? #6;"select !":RETU
   RN
GP 2320 POSITION 5,2:? #6;"         ":RETU
   RN
CQ 2330 GOSUB 2550
HV 2340 REM VERTICAL  MOVE
NI 2350 YY=24:FOR XX=22 TO 8 STEP -2:GOSU
   B 2490:YY=YY-2
ZV 2360 GOSUB 2500:NEXT XX
HJ 2370 REM FLASH
BB 2380 GOSUB 2510
SQ 2390 REM HORIZONTAL MOVE
XA 2400 FOR X=17 TO 8 STEP -1:POSITION X,
   18:? #6;"BY":POSITION X+2,18:? #6;" ":
   NEXT X:GOSUB 2520
XA 2410 FOR Y=13 TO 1 STEP -1:POSITION Y,
   20:? #6;"RALPH ":NEXT Y
LR 2420 FOR V=17 TO 7 STEP -1:POSITION V,
   20:? #6;"B. ":NEXT V
JP 2430 FOR G=13 TO 10 STEP -1:POSITION G
   ,20:? #6;"DAVIS ":NEXT G
OX 2440 POSITION 16,20:? #6;"SR.":GOSUB 2
   520
NK 2450 POSITION 1,3:? #6;"+ ■ x % + ■ x
   % +"
WN 2460 POSITION 1,11:? #6;"+ ■ x % + ■ x
   % +"
PJ 2470 GOSUB 2510:REM FLASH #2
PR 2480 FOR T=1 TO 30:NEXT T:RETURN
QY 2490 POSITION 3,XX:? #6;"MATH ATTACK !
   ":SOUND 0,XX,6,10:RETURN
NL 2500 POSITION 3,YY:? #6;"
   ":SOUND 0,0,0,0:RETURN
RL 2510 FOR Z=1 TO 10:YY=7:GOSUB 2500:GOS
   UB 2490:NEXT Z
XQ 2520 FOR JW=15 TO 0 STEP -2.5:FOR J=2
   TO 0 STEP -1:SOUND 0,1+13*J,10,JW:NEXT
   J:NEXT JW:RETURN
TQ 2530 FOR T=1 TO 2:NEXT T:RETURN
OD 2540 SOUND 0,10,2,8:GOSUB 2530:SOUND 0
   ,0,0,0:RETURN
JJ 2550 GRAPHICS 1+16:GOSUB 35:POKE 711,1
   52:COLOR 4:POKE 711,140:COLOR 3:POKE 7
   11,136:COLOR 4:RETURN
PU 2560 POKE 752,1:? "■":POKE 710,144:POK
   E 712,66
KB 2570 ? :? :? :? :? "Press":? :? "
   F FOR FLASH CARDS":? :? "        T FO
   R TEST"
IT 2580 CLOSE #1:OPEN #1,4,0,"K:"
JN 2590 GET #1,N
TK 2600 B$=CHR$(N):CLOSE #1
RO 2610 IF B$="F" OR B$="f" THEN 90
IW 2620 IF B$="T" OR B$="t" THEN 1830
UD 2630 GOTO 2580
JL 3000 POSITION 2,19:? "■■■■NON-ZERO IN
   TEGERS ONLY■■■■■■■■":RETURN
```

LISTING 2

```
FF 10 REM MATH ATTACK
JQ 20 REM BY RALPH B. DAVIS SR.
LC 25 REM (SPEECH MODULE BY BILL MARQUARD
   T)
GL 30 REM (c) 1986, ANTIC PUBLISHING
NI 31 REM DO NOT RENUMBER THIS PROGRAM!
RM 45 DIM NUM$(4)
HL 572 IF CT=4 THEN NUM=DIV:GOSUB 29000:R
   ESTORE (31500+CT):GOSUB 30000:GOSUB 31
   600:NUM=Y:GOSUB 29000:GOTO 580
TH 575 NUM=Y:GOSUB 29000:RESTORE (31500+C
   T):GOSUB 30000:GOSUB 31600:NUM=X:GOSUB
   29000
CE 29000 REM SAY THE NUMBER
OT 29010 NUM$=STR$(NUM):NL=LEN(NUM$)
QD 29020 ON NL GOSUB 29400,29300,29200,29
   100
QQ 29025 GOSUB 31600
EC 29030 RETURN
RF 29100 RESTORE 31000+VAL(NUM$(1,1)):GOS
   UB 30000
TW 29105 RESTORE 31110:GOSUB 30000
CJ 29110 IF NUM$(2,2)<>"0" THEN RESTORE 3
   1000+VAL(NUM$(2,2)):GOSUB 30000:RESTOR
   E 31100:GOSUB 30000
DO 29115 IF NUM$(3,3)>"1" THEN RESTORE 31
   000+VAL(NUM$(3,3))*10:GOSUB 30000
BB 29120 IF NUM$(3,3)="1" THEN RESTORE 31
   000+VAL(NUM$(3,4)):GOSUB 30000
RX 29125 IF NUM$(3,3)<>"1" AND NUM$(4,4)<
   >"0" THEN RESTORE 31000+VAL(NUM$(4,4))
   :GOSUB 30000
EF 29130 RETURN
OA 29200 RESTORE 31000+VAL(NUM$(1,1)):GOS
   UB 30000:RESTORE 31100:GOSUB 30000
YF 29205 IF NUM$(2,2)>"1" THEN RESTORE 31
   000+VAL(NUM$(2,2))*10:GOSUB 30000
VS 29210 IF NUM$(2,2)="1" THEN RESTORE 31
   000+VAL(NUM$(2,3)):GOSUB 30000
II 29215 IF NUM$(2,2)<>"1" AND NUM$(3,3)<
   >"0" THEN RESTORE 31000+VAL(NUM$(3,3))
   :GOSUB 30000
FD 29225 RETURN
```

continued on next page

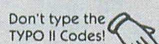
```
SB 29300 IF NUM$(1,1)>"1" THEN RESTORE 31
   000+VAL(NUM$(1,1))*10:GOSUB 30000
RI 29305 IF NUM$(1,1)="1" THEN RESTORE 31
   000+VAL(NUM$(1,2)):GOSUB 30000
XY 29310 IF NUM$(1,1)<>"1" AND NUM$(2,2)<
   >"0" THEN RESTORE 31000+VAL(NUM$(2,2))
   :GOSUB 30000
FC 29315 RETURN
TX 29400 RESTORE 31000+VAL(NUM$):GOSUB 30
   000:RETURN
GD 30000 REM SPEECH
ED 30010 READ CN:FOR AL=1 TO CN:READ D
WR 30020 PK=PEEK(54018):POKE 54018,PK-4
UO 30030 POKE 54016,127:POKE 54018,PK
QG 30040 POKE 54016,D+64:FOR ZZ=1 TO 2:NE
   XT ZZ:POKE 54016,D
BE 30050 NEXT AL:GOSUB 31600:RETURN
SM 30999 REM DATA FOR NUMBERS
EQ 31000 DATA 5,43,19,60,53,3
WF 31001 DATA 6,46,15,15,11,11,3
SR 31002 DATA 3,13,31,3
ZV 31003 DATA 6,29,51,0,12,19,3
EQ 31004 DATA 5,40,40,2,58,3
DO 31005 DATA 5,40,40,6,35,3
RC 31006 DATA 8,55,55,12,12,2,41,55,3
HC 31007 DATA 8,55,55,7,7,35,12,11,3
TI 31008 DATA 4,20,2,13,3
EO 31009 DATA 5,56,24,6,11,3
GF 31010 DATA 5,13,7,7,11,3
BO 31011 DATA 8,12,45,7,7,35,12,11,3
RE 31012 DATA 7,13,48,7,7,45,35,3
VI 31013 DATA 8,13,51,1,2,13,19,11,3
AG 31014 DATA 8,40,58,1,2,13,19,11,3
FX 31015 DATA 9,40,12,40,1,2,13,19,11,3
HP 31016 DATA 13,55,55,12,2,41,55,1,2,13,
   19,1,11,3
UF 31017 DATA 12,55,55,7,35,12,11,1,2,13,
   19,11,3
YD 31018 DATA 7,20,1,2,13,19,11,3
LQ 31019 DATA 10,56,24,6,11,1,2,13,19,11,
   3
FZ 31020 DATA 10,13,48,7,7,11,1,2,13,19,3
   ,(TWENTY)
ZR 31030 DATA 7,29,52,1,2,13,19,3,(THIRTY
   )
TL 31040 DATA 6,40,58,2,13,19,3,(FORTY)
YL 31050 DATA 10,40,40,12,40,40,1,2,13,19
   ,3,(FIFTY)
AX 31060 DATA 11,55,55,12,2,41,55,1,2,13,
   19,3,(SIXTY)
SX 31070 DATA 11,55,55,7,35,12,11,1,2,13,
   19,3,(SEVENTY)
EW 31080 DATA 5,20,2,13,19,3,(EIGHTY)
JB 31090 DATA 7,56,6,11,2,13,19,3,(NINETY
   )
DY 31100 DATA 11,57,15,15,11,1,33,39,12,7
   ,21,3,(HUNDRED)
JU 31110 DATA 9,29,24,32,55,55,15,11,21,3
   ,(THOUSAND)
ED 31500 REM DATA FOR WORDS
VW 31501 DATA 4,45,15,55,3,(PLUS)
QE 31502 DATA 6,6,1,56,15,55,3,(MINUS)
TG 31503 DATA 6,13,24,6,16,43,3,(TIMES)
DH 31504 DATA 14,33,12,35,6,1,33,12,1,21,
   3,63,24,6,3,(DIVIDED BY)
TL 31600 FOR DL=1 TO 15:NEXT DL
DX 31610 RETURN
```

automated raffle picks

DOOR PRIZE

Article on page 27

LISTING 1


Don't type the TYPO II Codes!

```
AL 10 REM DOOR PRIZE
IV 20 REM BY BILL MARQUARDT
GL 30 REM (c) 1986, ANTIC PUBLISHING
ON 32 BRK=1:IF PEEK(53279)=5 THEN BRK=0
LY 33 GOTO 100
JD 35 POKE 77,0:IF BRK THEN POKE 16,112:P
   OKE 53774,112
AF 36 RETURN
DS 100 DIM A$(38),B$(1),NUM$(4),X(3)
ES 140 POKE 53251,90:POKE 53250,110
FW 150 POKE 53249,130:POKE 53248,150
OP 170 POKE 53256,1:POKE 53257,1
RV 180 POKE 53258,1:POKE 53259,1
DA 196 POKE 623,4:GOSUB 900
VO 200 BASE=PEEK(106)-4:POKE 106,BASE
HS 210 GRAPHICS 3+16:POKE 559,46
ZV 215 FOR I=704 TO 710:POKE I,0:NEXT I
MY 220 GOSUB 35:POKE 708,0
AO 240 POKE 54279,BASE
BD 250 POKE 53277,3:GOSUB 2000
HP 260 P0BASE=BASE*256+512
OK 270 P1BASE=P0BASE+128:P2BASE=P0BASE+25
   6:P3BASE=P0BASE+384
EY 290 FOR I=0 TO 511:POKE P0BASE+I,0
FV 310 NEXT I
FR 320 DL=PEEK(560)+256*PEEK(561)
BV 330 POKE DL+8,7:POKE DL+9,6
EX 336 POKE DL+10,7
UG 340 W=PEEK(88)+256*PEEK(89)
TP 350 READ A$:FOR I=1 TO 14:B$=A$(I,I)
OO 354 POKE W+I+32,ASC(B$)-32:NEXT I
GE 358 READ A$:FOR I=1 TO 8:B$=A$(I,I)
UA 360 POKE W+I+55,ASC(B$)+64:NEXT I
QB 362 READ A$:FOR I=1 TO 10:B$=A$(I,I)
RY 364 POKE W+I+74,ASC(B$)-32:NEXT I
XC 366 DATA ANTIC MAGAZINE,presents
QT 369 DATA DOOR PRIZE
IN 370 FOR I=704 TO 707:POKE I,15:NEXT I:
   POKE 708,40:POKE 709,72:POKE 710,148:G
   OSUB 800
YI 380 GOSUB 960:GOSUB 400:GOSUB 500:GOSU
   B 600:GOSUB 700
XQ 395 POKE 764,255
NV 396 IF PEEK(764)=255 AND STRIG(0) THEN
    396
QO 397 GOTO 370
WN 400 FOR J=0 TO X(3)
SS 401 SOUND 0,1,0,14:SOUND 0,0,0,0
IA 403 FOR I=73 TO 80
UK 405 P=255-PEEK(START+J*8+I-72)
EF 410 POKE P0BASE+I,P:POKE P1BASE+I,P
HJ 412 POKE P2BASE+I,P:POKE P3BASE+I,P
AM 421 NEXT I:NEXT J:RETURN
VW 500 FOR J=0 TO X(2)
XP 502 SOUND 0,25,10,10:SOUND 0,0,0,0
IB 503 FOR I=73 TO 80
UL 505 P=255-PEEK(START+J*8+I-72)
EG 510 POKE P0BASE+I,P:POKE P1BASE+I,P
XD 512 POKE P2BASE+I,P
AN 521 NEXT I:NEXT J:RETURN
VF 600 FOR J=0 TO X(1)
XN 601 SOUND 0,25,10,10:SOUND 0,0,0,0
```

```
IC 603 FOR I=73 TO 80
UM 605 P=255-PEEK(START+J*8+I-72)
EH 610 POKE P0BASE+I,P:POKE P1BASE+I,P
AO 621 NEXT I:NEXT J:RETURN
UO 700 FOR J=0 TO X(0)
XO 701 SOUND 0,25,10,10:SOUND 0,0,0,0
ID 703 FOR I=73 TO 80
UN 705 P=255-PEEK(START+J*8+I-72)
WD 710 POKE P0BASE+I,P
AP 721 NEXT I:NEXT J:RETURN
AS 800 START=PEEK(756)*256+128
OR 810 FOR I=0 TO 7
HI 820 P=255-PEEK(START+I)
RB 830 POKE P0BASE+72+I,P
RO 840 POKE P1BASE+72+I,P
SB 850 POKE P2BASE+72+I,P
SO 860 POKE P3BASE+72+I,P
NC 870 NEXT I:RETURN
RP 900 GRAPHICS 0:GOSUB 35
KW 915 TRAP 915:POSITION 2,9
AF 920 ? "Enter LOWEST possible winning n
   umber."
IO 921 POSITION 18,12:? "□□□□":REM ^M
DY 923 POSITION 17,11:? "     "
YG 927 POSITION 17,11:INPUT LO
MC 929 IF LO<0 OR LO>9999 THEN 923
ML 930 POSITION 1,9
ZW 931 ? "Enter HIGHEST possible winning
   number."
PR 932 TRAP 932
EA 933 POSITION 17,11:? "     "
NW 935 POSITION 17,11:INPUT HI
LN 950 IF HI>9999 OR HI<=LO THEN 933
JO 952 TRAP 40000
AE 955 RETURN
TV 960 X=INT(RND(0)*(HI-LO+1))+LO:NUM$="0
   000"
CF 970 IF X>0 THEN NUM$(4-INT(CLOG(X)),4)
   =STR$(X)
CA 985 FOR Y=0 TO 3:X(Y)=VAL(NUM$(4-Y,4-Y
   )):NEXT Y:RETURN
YD 2000 COLOR 1:PLOT 9,14:DRAWTO 30,14
VX 2010 DRAWTO 30,17:DRAWTO 9,17
UO 2020 DRAWTO 9,14:RETURN
```

LISTING 2

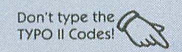
```
SS 10 REM DOOR PRIZE, LISTING 2
IV 20 REM BY BILL MARQUARDT
SR 25 REM (SPEECH MODULE)
HA 30 REM (c) 1987, ANTIC PUBLISHING
NI 31 REM DO NOT RENUMBER THIS PROGRAM!
TW 392 GOSUB 30000
PB 30000 FOR I=1 TO LEN(NUM$)
NF 30010 RESTORE 31000+VAL(NUM$(I,I))
YK 30020 FOR S=1 TO 8:READ D
UO 30025 P=PEEK(54018):POKE 54018,P-4
BM 30026 POKE 54016,127:POKE 54018,P
ZA 30030 IF PEEK(54016)>128 THEN 30030
QG 30040 POKE 54016,D+64:FOR ZZ=1 TO 2:NE
   XT ZZ:POKE 54016,D
UF 30050 NEXT S:NEXT I
DX 30060 RETURN
KD 31000 DATA 43,60,53,0,0,0,0,4
NL 31001 DATA 46,12,15,11,0,0,0,4
BL 31002 DATA 13,31,0,0,0,0,0,4
VZ 31003 DATA 29,51,0,12,19,0,0,4
LX 31004 DATA 40,40,58,0,0,0,0,4
NL 31005 DATA 40,40,6,35,0,0,0,4
VO 31006 DATA 55,55,12,12,2,41,55,4
OX 31007 DATA 55,55,7,7,35,12,11,4
DG 31008 DATA 20,2,13,0,0,0,0,4
OF 31009 DATA 56,24,6,11,0,0,0,4
```

impressive menu-maker for your programs

MENU MAESTRO

Article on page 63

LISTING 1




```
ZE 10 REM SCROLLING MENU UTILITY
QU 20 REM BY EARL HILL
GL 30 REM (c) 1986, ANTIC PUBLISHING
BM 120 DIM A$(145),ME$(80),B$(44),P$(17)
MV 130 TOP=PEEK(741)+PEEK(742)*256+6
DH 140 GOSUB 350:REM STRING ASSIGNMENTS
EQ 160 GRAPHICS 0:POKE 708,200:POKE 709,2
   50:POKE 710,76:POKE 711,200:POKE 712,5
   3
HL 170 REM MENU SELECTOR
CC 180 GOSUB 390:GOSUB 400:POKE 16,112:PO
   KE 53774,112:POKE 752,1:? :POSITION 2,
   2:? "  menu selector  "
HR 190 POSITION 24,4:? "CHOICE ?":POSITIO
   N 3,6:? "1■";"ITEM #1":POSITION 23,6:?
    "2■";"ITEM #2"
AE 200 POSITION 3,7:? "3■";"ITEM #3":POSI
   TION 23,7:? "4■";"ITEM #4":POSITION 3,
   8:? "5■";"ITEM #5"
RN 210 POSITION 23,8:? "6■";"ITEM #6"
BJ 220 POSITION 3,9:? "7■";"ITEM #7":POSI
   TION 23,9:? "8■";"ITEM #8"
QH 225 POSITION 3,10:? "9■";"ITEM #9":POK
   E 764,255:IF PEEK(TOP+1)<>2 THEN GOSUB
    400
AT 230 SEL=USR(ADR(A$),ADR(ME$),TOP+527,2
   0):ON SEL GOSUB 250,260,270,280,290,30
   0,310,314,318:GOTO 180
WL 240 REM SELECTED OPTIONS
FY 250 Q=250:GOSUB 330:? P$;Q:GOSUB 340:R
   ETURN
XF 260 Q=260:GRAPHICS 0:GOSUB 330:? P$;Q:
   GOSUB 340:RETURN
CR 270 Q=270:GRAPHICS 1+16:GOSUB 330:? #6
   ;P$;Q:GOSUB 340:RETURN
DV 280 Q=280:GRAPHICS 2+16:GOSUB 330:? #6
   ;P$;Q:GOSUB 340:RETURN
OE 290 Q=290:GRAPHICS 0:? P$;Q:GOSUB 340:
   RETURN
AH 300 Q=300:GRAPHICS 1+16:GOSUB 330:? #6
   ;P$;Q:GOSUB 340:RETURN
BL 310 Q=310:GRAPHICS 2+16:GOSUB 330:? #6
   ;P$;Q:GOSUB 340:RETURN
XI 314 Q=314:GRAPHICS 0:GOSUB 330:? #6;P$
   ;Q:GOSUB 340:RETURN
EJ 318 Q=318:GRAPHICS 1+16:GOSUB 330:? #6
   ;P$;Q:GOSUB 340:RETURN
NW 320 END
LN 330 POKE 710,16*INT(16*RND(0))+5:RETUR
   N
SL 340 FOR DE=1 TO 150:SOUND 0,DE,14,14:N
   EXT DE:SOUND 0,0,0,0:RETURN
```

continued on next page

```
AO 350 REM STRING ASSIGNMENTS
RK 352 A$(1,72)="hh[illegible]"
JV 354 A$(73,145)="[illegible]"
SU 356 B$="[illegible]Rhh[illegible]"
WX 360 P$="PGM WENT TO LINE "
YW 370 ME$="♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥please♥♥e
nter♥♥your♥♥selection♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥"
ZP 380 RETURN
KJ 390 POKE 690,255:POKE 82,0:POKE 83,39:
RETURN
BG 400 ? "[illegible]":AA=USR(ADR(B$),TOP):RETURN
```

LISTING 2

```
AZ 10 REM SCROLLING MENU, LISTING 2
QU 20 REM BY EARL HILL
GL 30 REM (c) 1986, ANTIC PUBLISHING
EF 35 REM (CREATES LINES 352-356 FOR SCRO
LLING MENU UTILITY)
CQ 40 REM (LINES 10-220 MAY BE USED WITH
OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
EG 70 FN$="D:MLINES.LST":REM THIS IS THE
NAME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "     ANTIC'S GENERIC
BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
wn...T-";INT(LM/10);")      "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "[illegible]TOO
MANY DATA LINES!":? "CANNOT CREATE FIL
E!":END
CZ 180 IF C<LN+1 THEN ? :? "[illegible]TOO FEW DATA
 LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
"

GS 1000 DATA 233
VT 1010 DATA 051053050032065036040049044O
550500410610341041041332131041332121O4
133207104133206104104133203
UR 1020 DATA 169000133205162008169022133Z
041642051730112122082511420042121772l2
072152229205168104145206152
RB 1030 DATA 101205168200198204208237240O
171041702022082162302051642051920552O8
206134034155051053052032065
NZ 1040 DATA 036040055051044049052053041O
610342052402021380721652031602551362O8
253198203208247133203173252
LI 1050 DATA 002201255240025170189254254Z
010491440172010581760130410151332121G9
255141252002169000240018169
PC 1060 DATA 255141252002173031208201007Z
401801690101332121690001332131040961G9
034155051053054032066036061
JW 1070 DATA 034169000133082104104133204l
041332031600011690021452031690062001A5
203200169006200145203192019
TY 1080 DATA 208249169022200200145203169O
002001452030960341 55
```

---

lesson 10: strings

NEW OWNERS COLUMN

Article on page 38

LISTING 1

Don't type the TYPO II Codes!

```
AS 10 REM THE NEW OWNER'S COLUMN PART 10
PQ 20 REM BY DAVID PLOTKIN
HA 30 REM (c) 1987, ANTIC PUBLISHING
OC 35 GRAPHICS 2+16:POSITION 2,4:PRINT #6
;"antic presents"
AX 40 DIM EQHD$(700),EQIMP(7),DFHD$(700),
DFI1(7),DFI2(7),DFI3(7),DFI4(7)
TY 50 DIM DFI5(7),DFI6(7),DFI7$(700),DFIN
(7),DFFN(7),CRFC(7),CRHD$(700)
PP 60 DIM PRC(6),NMSHR(6),CURI(6)
AK 70 DIM RDHD$(100),RDH2$(100),RDH3$(100
),RDH4$(100),ANSWER$(5),DRAW$(4)
WJ 80 EQHD$(1)=" ":EQHD$(700)=EQHD$:EQHD$
(2)=EQHD$
GC 81 REM LINE 80 IS A VERY QUICK WAY TO
DO THIS:  FOR LP=1 TO 700:EQHD$(LP,LP)
=" ":NEXT LP
HF 90 DFHD$=EQHD$:DFI7$=EQHD$:CRHD$=EQHD$
:RDHD$=EQHD$:RDH2$=EQHD$:RDH3$=EQHD$:R
DH4$=EQHD$
BP 100 IN=1
JS 110 FOR LP=1 TO 7
ZE 120 READ RDHD$,RDI
TA 130 EQHD$(IN)=RDHD$:EQIMP(LP)=RDI
PS 140 IN=IN+100
PB 150 NEXT LP
CB 160 IN=1
KE 170 FOR LP=1 TO 7
QU 180 READ RDH2$,RDI1,RDI2,RDI3,RDI4,RDI
5,RDI6
CE 190 DFHD$(IN)=RDH2$:DFI1(LP)=RDI1:DFI2
(LP)=RDI2:DFI3(LP)=RDI3:DFI4(LP)=RDI4:
DFI5(LP)=RDI5:DFI6(LP)=RDI6
PL 200 IN=IN+100
OU 210 NEXT LP
BU 220 IN=1
JX 230 FOR LP=1 TO 7
LO 240 READ RDH3$,RDI7,RDI8,RDCR,RDH4$
YA 250 DFI7$(IN)=RDH3$:DFIN(LP)=RDI7:DFFN
(LP)=RDI8:CRFC(LP)=RDCR:CRHD$(IN)=RDH4
$
PX 260 IN=IN+100
PG 270 NEXT LP
UV 280 CASH=10000:REM CASH TO START
AY 290 PRC(1)=20:REM STARTING PRICES OF S
TOCK
FF 300 PRC(2)=30
HM 310 PRC(3)=70
GN 320 PRC(4)=40
HK 330 PRC(5)=50
HJ 340 PRC(6)=40
JL 350 FOR LP=1 TO 6
```

```
BT 360 NMSHR(LP)=0
PH 370 NEXT LP
PF 380 DRAW$="*◣◣*":REM ASTERISK,CONTROL-
       J,INVERSE CONTROL-J,INVERSE ASTERISK
PT 390 FOR PS=0 TO 17 STEP 4:POSITION PS,
       3:PRINT #6;DRAW$:POSITION PS,8:PRINT #
       6;DRAW$:NEXT PS
AC 400 POSITION 3,9:PRINT #6;"PRESS ANY K
       EY";
HW 410 POSITION 3,5:PRINT #6;"STOCK MARKE
       T";:POKE 764,255
WA 420 HLD=PEEK(708):POKE 708,PEEK(709):P
       OKE 709,PEEK(710):POKE 710,PEEK(711):P
       OKE 711,HLD
UI 430 IF PEEK(764)=255 THEN FOR WT=1 TO
       50:NEXT WT:GOTO 420
WS 440 POKE 764,255
YJ 460 GRAPHICS 0:POKE 82,0:PRINT
QG 920 REM MAIN PROGRAM
WS 930 CYCLES=CYCLES+1
LQ 940 IF CYCLES=7 THEN 2010
SN 950 GOSUB 1030
WN 960 GOSUB 1290
XM 970 GOSUB 1580
WP 980 GOSUB 1470
HK 990 IF CRIM=RDI8 THEN GRAPHICS 0:POSIT
       ION 0,10:PRINT CRHD$(IN2*100-99,IN2*10
       0):FOR LP=1 TO 200:NEXT LP
QY 1000 FOR LP=1 TO 150
QX 1010 NEXT LP
RG 1020 GOTO 920
YI 1030 REM PRINT HEADLINES
BF 1040 GRAPHICS 0
FG 1050 GOSUB 1880
LL 1060 IF EQHD$(FATE*100-99,FATE*100-99)
        ="*" THEN 1050
NC 1070 PRINT EQHD$(FATE*100-99,FATE*100)

CW 1080 EQHD$(FATE*100-99,FATE*100)="*"
LJ 1090 RDI=EQIMP(FATE)
ET 1100 GOSUB 1880
YM 1110 IF DFHD$(FATE*100-99,FATE*100-99)
        ="*" THEN 1100
GQ 1120 PRINT DFHD$(FATE*100-99,FATE*100)

ZE 1130 DFHD$(FATE*100-99,FATE*100)="*"
UX 1140 CURI(1)=DFI1(FATE)
WC 1150 CURI(2)=DFI2(FATE)
XH 1160 CURI(3)=DFI3(FATE)
YM 1170 CURI(4)=DFI4(FATE)
ZR 1180 CURI(5)=DFI5(FATE)
AW 1190 CURI(6)=DFI6(FATE)
EV 1200 GOSUB 1880
UX 1210 IF DFI7$(FATE*100-99,FATE*100-99)
        ="*" THEN 1200
ZT 1220 PRINT DFI7$(FATE*100-99,FATE*100)

VB 1230 DFI7$(FATE*100-99,FATE*100)="*"
VV 1240 RDI7=DFIN(FATE)
UU 1250 RDI8=DFFN(FATE)
BG 1260 RDCR=CRFC(FATE)
TR 1270 IN2=FATE
BB 1280 RETURN
BL 1290 REM MENU
KV 1300 STVAL=0
XC 1310 FOR LP=1 TO 6
VY 1320 STVAL=STVAL+NMSHR(LP)*PRC(LP)
RJ 1330 NEXT LP
DE 1340 GOSUB 1930
QB 1350 POSITION 0,22:?  "             ":POSITI
        ON 0,23:? "
        ";
FK 1360 POSITION 0,9:PRINT "  COMPANY
        SHARES    PRICE"
PG 1370 PRINT "1. SHAY-DEE PET","  ";NMSH
        R(1),PRC(1)
UA 1380 PRINT "2. LEMON COMP   ","  ";NMSH
        R(2),PRC(2)
PI 1390 PRINT "3. WEAP R US    ","  ";NMSH
        R(3),PRC(3)
KA 1400 PRINT "4. ADMIRAL MOT  ","  ";NMSH
        R(4),PRC(4)
JB 1410 PRINT "5. WORLD COMM   ","  ";NMSH
        R(5),PRC(5)
LI 1420 PRINT "6. HTKOLD G&E   ","  ";NMSH
        R(6),PRC(6)
YH 1430 PRINT "CASH ON HAND: ";CASH;"

WJ 1440 PRINT "VALUE OF STOCK: ";STVAL;"
        "
PE 1450 PRINT "TOTAL WORTH: ";CASH+STVAL
AZ 1460 RETURN
VE 1470 REM CALCULATE STOCK VALUE
XZ 1480 FOR LP=1 TO 6
TK 1490 PRC(LP)=PRC(LP)*RDI*CURI(LP)
RE 1500 NEXT LP
BX 1510 GOSUB 1910
RS 1520 IF FATE>RDCR THEN GOTO 1550
HS 1530 CRIM=RDI7
SS 1540 GOTO 1560
IM 1550 CRIM=RDI8
PP 1560 PRC(IN2)=PRC(IN2)*CRIM
BE 1570 RETURN
CR 1580 REM PURCHASE,SELL
KQ 1590 POSITION 0,19:PRINT "DO YOU WISH
        TO: "
AS 1600 POSITION 0,20:PRINT "1. BUY    2.
        SELL    3. NEXT CYCLE "
XO 1610 POSITION 0,21:PRINT "ENTER 1, 2,
        OR 3"
FP 1620 GOSUB 2095:INPUT CHC
EK 1630 IF CHC<1 OR CHC>3 THEN 1610
JD 1640 IF CHC=2 THEN 1770
UK 1650 IF CHC=3 THEN RETURN
CA 1660 POSITION 0,20:PRINT "BUY WHICH NU
        MBER?                                  "
JV 1670 POSITION 0,21:PRINT "ENTER A NUMB
        ER 1 THROUGH 6.                         "
BH 1680 GOSUB 2095:INPUT CHC:IF CHC<1 OR
        CHC>6 THEN 1670
YK 1690 POSITION 0,21:PRINT "HOW MANY SHA
        RES?                                   "
YP 1700 GOSUB 2095:INPUT CHC2:IF CHC2<0 T
        HEN 1690
IX 1710 IF PRC(CHC)*CHC2>CASH THEN 1750
QX 1720 NMSHR(CHC)=NMSHR(CHC)+CHC2
NZ 1730 CASH=CASH-(PRC(CHC)*CHC2)
GN 1740 POP :GOTO 960
KX 1750 PRINT "YOU DON'T HAVE ENOUGH MONE
        Y!    ";:POSITION 0,22:? "         ";
UC 1760 GOTO 1580
GK 1770 POSITION 0,20:PRINT "SELL WHICH N
        UMBER?                                 "
KA 1780 POSITION 0,21:PRINT "ENTER A NUMB
        ER 1 THROUGH 6.                         "
FL 1790 GOSUB 2095:INPUT CHC:IF CHC<1 OR
        CHC>6 THEN 1780
XN 1800 POSITION 0,21:PRINT "HOW MANY SHA
        RES?                                   "
TB 1810 INPUT CHC2:IF CHC2<0 THEN 1800
BY 1820 IF CHC2>NMSHR(CHC) THEN 1860
TE 1830 NMSHR(CHC)=NMSHR(CHC)-CHC2
RY 1840 CASH=CASH+CHC2*PRC(CHC)
GS 1850 POP :GOTO 960
ZW 1860 PRINT "YOU DON'T HAVE THAT MANY S
        HARES!";:POSITION 0,22:? "         ";
UH 1870 GOTO 1580
IP 1880 REM RANDOMIZATION
YJ 1890 FATE=INT(RND(0)*6)+1
AR 1900 RETURN
VV 1910 FATE=INT(RND(0)*4)+1
AX 1920 RETURN
YI 1930 REM ROUNDING
XX 1940 FOR LP=1 TO 6
AR 1950 NMSHR(LP)=INT(NMSHR(LP)*100)/100
VC 1960 PRC(LP)=INT(PRC(LP)*100)/100
SH 1970 NEXT LP
MT 1980 CASH=INT(CASH*100)/100
BJ 1990 STVAL=INT(STVAL*100)/100
AA 2000 RETURN
WZ 2010 REM CLOSING
QO 2020 GRAPHICS 0:GOSUB 1290
LJ 2030 PRINT "YOU HAVE COMPLETED SIX CYC
        LES!"
OK 2040 PRINT "YOU STARTED WITH $10,000."

HS 2050 PRINT "YOU NOW HAVE $";CASH;" CAS
        H."
BO 2060 PRINT "AND $";STVAL;" WORTH OF ST
        OCK."
FF 2070 PRINT "THIS IS A TOTAL VALUE OF $
        ";CASH+STVAL;" ."
SO 2080 PRINT "BYE FOR NOW!"
FP 2090 END
XZ 2095 ? "      ←←←←←";:RETURN
NZ 2100 REM DATA
QV 2110 DATA INFLATION INCREASING!,.90
YE 2120 DATA DOLLAR GAINS AGAINST FOREIGN
         CURRENCY,1.10
CB 2130 DATA NEW INCOME TAX FAVORS LARGE
        COMPANIES,1.10
MF 2140 DATA COUNTRY'S THREE LARGEST BANK
```

continued on next page

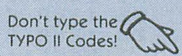
```
   5 REPORT    HEAVY LOSSES!,.95
MM 2150 DATA PRIME RATE DOWN,1.10
TT 2160 DATA ECONOMIC INDICATORS DOWN!,.8
   5
NF 2170 DATA DUMMY,0
TP 2180 DATA OIL EMBARGO-LONG GAS LINES-H
   IGH PRICES!,1.3,1.0,.95,.90,1.10,.85
XH 2190 DATA WAR IN CENTRAL AMERICA!,.95,
   1.0,1.05,1.0,1.2,1.0
EL 2200 DATA NEW TRADE AGREEMENT WITH FAR
    EAST.,1.2,1.3,1.0,1.2,1.1,1.0
AK 2210 DATA ALTERNATE ENERGY SOURCE FOUN
   D BY LOCAL  UTILITY,.8,1.0,1.0,1.2,1.1
   ,1.4
SN 2220 DATA ENVIRONMENTALLY SAFE COAL RE
   MOVAL METHODFOUND,.8,1.0,1.1,1.1,1.0,1
   .2
BV 2230 DATA PENTAGON GOES ON BUYING SPRE
   E--MOST      CONTRACTS AWARDED TO FOREI
   GN FIRMS!,1.0,.9,.85,1.0,1.2,1.0
VK 2240 DATA DUMMY,0,0,0,0,0,0
XA 2250 DATA SHAY-DEE PETROLEUM TO MERGE
   WITH VERY   PROFITABLE OIL FIRM!,2.0,.
   4,1
EL 2260 DATA SEC DOES NOT APPROVE SHAY-DE
   E PETRO     MERGER.
EK 2270 DATA NEW CLONE OF LEMON COMPUTER
   COSTS HALF  AS MUCH,.5,2.1,3
ZN 2280 DATA CUSTOMS IMPOUNDS ALL LEMON C
   LONES!
KC 2290 DATA BIG ARMS SALE BY WEAPONS 'R
   US TO       CENTRAL AMERICA.,1.5,.7,3
KY 2300 DATA CENTRAL AMERICAN COUNTRY REF
   USES TO PAY FOR ARMS!
EH 2310 DATA ADMIRAL MOTORS SALES HIT ALL
   -TIME HIGH  AS REBATE PLAN ANNOUNCED.,
   1.8,.5,3
AP 2320 DATA NEW KOREAN IMPORT LOOKS AND
   DRIVES JUST LIKE ADMIRAL MOTORS CARS--
   COSTS MUCH    LESS.
YB 2330 DATA WORLDWIDE REPORTERS HELD FOR
    RANSOM.,.8,1.2,2
YV 2340 DATA WORLDWIDE REPORTERS FREED BY
    COMMANDO   RAID!
BN 2350 DATA HG&E WINS LARGE RATE HIKE,1.
   3,.75,2
KR 2360 DATA PUC DISALLOWS RATE HIKE DUE
   TO IMPROPER MARKETING PRACTICES.
YV 2370 DATA DUMMY,0,0,0,DUMMY
```

game of the month

REBOUND

Article on page 57

LISTING 1




```
DL 1 REM REBOUND GAME
DY 2 REM BY J.D. CASTEN
FR 3 REM (c) 1986, ANTIC PUBLISHING
VI 4 FLIPSTOSTART=5:FIRSTSCREEN=1:FLIPBON
   US=1
JW 5 BRK=1:IF PEEK(53279)=5 THEN BRK=0
IJ 6 GOTO 1000
JV 100 FOR Z=0 TO 1 STEP 0:FOR J=J1 TO J2
    STEP J3:OX=X:OY=Y:U=USR(ADR(D$),X,Y,I
   (S),M+J*2,S(J)):IF U THEN 200
WD 105 Y=Y+YD:LOCATE X,Y,K:Y$=B$(K+J*256)
   :IF Y$="O" THEN 150
EO 106 H=8:V=6:T2=4
YL 109 IF Y$="B" THEN YD=-YD:Y=OY+YD:LOCA
   TE X,Y,K:Y$=B$(K+J*256):IF Y$="O" THEN
    T=T2:GOTO 150
XG 110 IF Y$="B" THEN Y=OY:H=1:GOTO 150
TH 112 IF Y$="J" THEN 161
AU 120 IF Y$="1" THEN H=7:V=4:Y$="B":GOTO
    250-141*(J3=-1)
LX 121 IF Y$="2" THEN H=7:V=4:Y$="B":GOTO
    250-141*(J3=1)
MK 130 IF Y$="5" THEN Y$="B":J1=J2:J2=5-J
   2:J3=-J3:H=3:V=4:T2=8:GOTO 109
ZI 133 IF Y$="T" THEN IF X<>OX OR Y<>OY T
   HEN X=TX-X:Y=TY-Y:H=21:V=4:T=10:GOTO 1
   90
PQ 140 IF Y$="D" THEN 250
IG 150 S=PEEK(632):X=X+X(S):LOCATE X,Y,K:
   X$=B$(K+J*256):IF X$="O" THEN 190
GS 155 IF X$="B" THEN X=OX:H=1:V=0:T=4:GO
   TO 190
TG 160 IF X$<>"J" THEN 171
SJ 161 H=17:V=12:T=6:PLOT X,Y:N=N+1:IF N=
   NM THEN 400
FD 162 YD=-YD:Y=OY+YD:LOCATE X,Y,K:Y$=B$(
   K+J*256):IF Y$="O" THEN 190
DT 163 Y=OY:GOTO 190
AK 171 IF X$="1" THEN H=8:V=4:T=4:X$="B":
   GOTO 250-95*(J3=-1):GOTO 190
KB 172 IF X$="2" THEN H=7:V=4:T=4:X$="B":
   GOTO 250-95*(J3=1):GOTO 190
MF 173 IF X$="5" AND T<8 THEN J1=J2:J2=5-
   J2:J3=-J3:H=3:V=4:T=8:X=OX:GOTO 190
XK 174 IF X$="T" AND (X<>OX OR Y<>OY) THE
   N X=TX-X:Y=TY-Y:H=21:V=4:T=10:GOTO 190
PQ 180 IF X$="D" THEN 250
OQ 190 IF T THEN T=T-2:SOUND 0,H,V,T
RF 199 NEXT J:NEXT Z
MM 200 IF PEEK(53254)<>1 THEN POKE 53278,
   0:GOTO 105
HV 250 POKE 5,X:POKE 6,Y:POKE 623,1:POKE
   707,54:D=F:IF D>255 THEN D=INT(F/255)
VN 251 K=72:FOR J=15 TO 0 STEP -1:POKE 15
   92,K:FOR I=J TO 0 STEP -5:SOUND 0,(J-I
   )*D,6,J:K=152-K:NEXT I:NEXT J
VV 252 F=F-1:GOTO 500+100*(F=0)
TG 300 T=6:H=32:V=4:TRAP 300:IF X<0 OR X>
   19 THEN X=19-OX:Y=OY:GOTO 105
VS 301 Y=23-Y:GOTO 105
CR 400 GOSUB 700:SC=SC+1:J1=0:J2=5:J3=1:F
   =F+FLIPBONUS:NG=NG+N:N=0
IO 405 TRAP 600:POKE 559,28:POSITION 0,0:
   GOSUB 1900+SC*50:TRAP 300:POKE 559,62
FT 410 RESTORE 1900+SC*50:READ J:POKE 708
   ,J:READ J:POKE 1610,J:READ J:POKE 710,
   J:READ J:POKE 1614,J:READ J
EP 420 POKE 712,J:READ TX,TY,NM,XB,YB
XS 500 GOSUB 700:YD=1:X=XB:Y=YB:POKE 5,X:
   POKE 6,Y:POKE 623,8:POKE 707,132
LQ 515 POSITION 2,23:? #6;"FLIPS: ";F-1;"
    ":SOUND 2,109,6,1:SOUND 3,110,6,1
XI 520 POKE 53762,26:H=1:V=0:T=0:POKE 77,
   0
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MN 525 POKE 53278,0:IF PEEK(53254)=1 THEN
    525
LQ 530 GOTO 100
EK 600 GOSUB 700:GRAPHICS 18:POKE 559,62:
   POKE 5,22:POKE 6,0
UP 605 POKE 710,14:POSITION 7,2:? #6;"THE
   END"
II 607 IF  NOT F THEN POKE 708,90:POSITIO
   N 2,4:? #6;"SAVED ";NG+N;" OGARTS"
NG 608 IF F THEN POKE 708,142:POSITION 0,
   4:? #6;"FLIP SAVES HUNDREDS":? #6;" AW
   ARDED KEY TO CITY"
CL 609 IF F THEN POKE 5,19:POKE 6,9:POKE
   1592,72
NF 610 POKE 709,28:POSITION 4,7-(F=0):? #
   6;"press trigger"
HZ 615 IF PEEK(644) THEN 615
OD 620 GOTO 1280
UI 700 FOR J=53760 TO 53767:POKE J,0:NEXT
    J:RETURN
DM 800 IF BRK THEN POKE 16,64:POKE 53774,
   64
ZH 801 RETURN
JD 1000 POKE 106,PEEK(740):M=PEEK(106)-14
   :POKE 106,M-2:GRAPHICS 17:GOSUB 800:M2
   =M+10
ZH 1001 ? #6;"        ReBoUnD":? #6;"
    BY":? #6;"      iNITiAlIzInG"
CB 1005 P=PEEK(88)+256*PEEK(89)
NM 1010 DIM M$(56),B$(1536),X(15),Y$(1),X
   $(1),I(15),S(5):RESTORE 9901:FOR J=1 T
   O 56:READ D:M$(J)=CHR$(D):NEXT J
SD 1015 DIM D$(34):FOR J=1 TO 34:READ D:D
   $(J)=CHR$(D):NEXT J
GX 1020 POKE M*256,0:U=USR(ADR(M$),M*256,
   M*256+1,3584):FOR J=0 TO 5:U=USR(ADR(M
   $),57872,M*256+J*512+8,504):NEXT J
AJ 1030 B$="B":B$(1536)="B":B$(2)=B$
XE 1035 FOR J=0 TO 1280 STEP 256
XV 1036 B$(45+J,45+J)="O":B$(173+J,173+J)
   ="O":B$(13+J,13+J)="O":B$(141+J,141+J)
   ="O"
CL 1040 B$(32+J,32+J)="O"
CA 1045 FOR K=90 TO 95
RH 1046 B$(K+J,K+J)="O"
RC 1047 IF J/256=K-90 THEN B$(K+J,K+J)="D
   "
HH 1049 NEXT K
AU 1050 B$(5+J,5+J)="S"
XR 1051 B$(36+J,36+J)="D"
KP 1052 B$(131+J,131+J)="J"
TW 1053 B$(154+J,154+J)="1"
ZX 1054 B$(1+J,1+J)="2"
MM 1055 FOR K=27 TO 30:B$(K+J,K+J)="T":NE
   XT K
GB 1090 NEXT J
NL 1099 RESTORE 9000
PP 1100 FOR K=0 TO 5:FOR J=8 TO 47:READ I
   :POKE M*256+K*512+J,I:NEXT J:NEXT K
AV 1105 FOR J=48 TO 127:READ I:FOR K=0 TO
    5:POKE M*256+J+K*512,I:NEXT K:NEXT J
DZ 1106 RESTORE 9800:FOR K=0 TO 9:READ I:
   FOR J=0 TO 5:U=USR(ADR(M$),57344+I*8,M
   *256+J*512+128+K*8,8):NEXT J:NEXT K
AF 1110 RESTORE 9200:FOR J=5 TO 15:READ I
   ,K:X(J)=I:I(J)=K:NEXT J
SB 1120 RESTORE 9300:FOR J=1536 TO 1685:R
   EAD I:POKE J,I:NEXT J:POKE 512,96:POKE
    513,6
UV 1125 RESTORE 9500:FOR J=1 TO 6:READ I,
   K:POKE 1536+I,M+K:NEXT J:U=USR(1536)
JQ 1130 FOR J=0 TO 5:K=M*256+J*512+464:PO
   KE K,0:U=USR(ADR(M$),K,K+1,47):FOR I=0
    TO 7
AP 1135 POKE K+I-256,PEEK((5-J)*512+M*256
   +8+I):POKE K+J*8+I,PEEK(M*256+(5-J)*51
   2+32+I):NEXT I:NEXT J
WI 1140 RESTORE 9900:FOR J=0 TO 5:READ I:
   S(J)=I:NEXT J
AA 1280 GRAPHICS 18:GOSUB 800:POKE 559,62
   :POKE 756,M
OL 1290 X=1:Y=0:XB=4:YB=6:XD=1:YD=1:H=-1:
   V=-1:OX=X:OY=Y:OXB=XB:OYB=YB:POKE 709,
   14:POKE 708,90:POKE 710,28
DW 1295 POSITION 2,11:? #6;"8QHFFDQ SN OK
   @X"
PX 1300 POSITION OX,OY:? #6;"          ":POS
   ITION X,Y:? #6;"█dantmc"
TD 1301 POSITION OXB,OYB:? #6;"
      ":POSITION XB,YB:? #6;"AX 5020 1@R
   SDM"
QW 1304 OX=X:X=X+XD:IF X=0 OR X=13 THEN X
   D=-XD:T=2
UT 1306 OY=Y:Y=Y+YD:IF Y=0 OR (Y>=YB-1 AN
   D YD=1) THEN YD=-YD:T=2
XH 1308 OXB=XB:XB=XB+H:IF XB=0 OR XB=6 TH
   EN H=-H:T=2
WA 1310 OYB=YB:YB=YB+V:IF (YB<=Y+2 AND V=
   -1) OR YB=10 THEN V=-V:T=2
KS 1320 IF T THEN T=T-1:SOUND 1,80,12,T
BU 1330 IF PEEK(644) THEN 1300
GN 1400 GRAPHICS 17:GOSUB 800:POKE 559,28
   :POKE 706,12:POKE 54279,M+6:POKE 53277
   ,3:POKE 54286,64
WE 1401 DL=PEEK(560)+256*PEEK(561):POKE D
   L+3,198
OI 1410 FOR J=7 TO 27:POKE DL+J,134:NEXT
   J:POKE 54286,192
US 1420 POKE 708,52:POKE 710,166:POKE 709
   ,14
MZ 1430 COLOR 32:S=15:POKE 623,1:SC=FIRST
   SCREEN-1:POKE 756,M:F=FLIPSTOSTART:NG=
   0:N=0
QS 1499 GOTO 400
AT 1949 REM SCREEN #1
JR 1950 ? #6;" █dkbnld sn █dantmc ";
DT 1951 ? #6;"██████████ ██████████████";
DV 1952 ? #6;"█                       Z█";
UD 1953 ? #6;"██          █████       [█";
GL 1954 ? #6;"█                       \█";
HT 1955 ? #6;"█                       ]█";
JB 1956 ? #6;"█                       ^█";
YJ 1957 ? #6;"█ ███████          ████_█";
TJ 1958 ? #6;"█                  ███Z█";
VB 1959 ? #6;"█                    █[█";
WI 1960 ? #6;"█          ██$██     █\█";
WG 1961 ? #6;"█                    █]█";
CM 1962 ? #6;"█         oq█bShbd   █^█";
AB 1963 ? #6;"           rbqddM        ";
QR 1964 ? #6;"       █                 ";
DM 1965 ? #6;"      ████               ";
NT 1966 ? #6;"█ ████                █ █";
GC 1967 ? #6;"█ ████ ,          , ,█████";
QG 1968 ? #6;"█ ,    ,          ,      █";
JZ 1969 ? #6;"█     , , ,██████,,,,,  █";
ZP 1970 ? #6;"█ ,,,     ██████ ,      █";
YB 1971 ? #6;"█          ,          , ,█";
ED 1972 ? #6;"██████████ ██████████████";
WZ 1973 RETURN :DATA 52,136,166,10,0,19,2
   4,1,1,2
CA 1999 REM SCREEN #2
TI 2000 ? #6;"████████████████████████████";
KV 2001 ? #6;"  █   █   █   █   ]█";
XD 2002 ? #6;"█ ██ █ █ █ █ █     ^██";
AJ 2003 ? #6;" █   █ █    █ █████ _█";
QW 2004 ? #6;"█ █ ██ ████    ███ █ Z██";
CF 2005 ? #6;" █ █     ████ ███ █ [█";
OM 2006 ? #6;"█ █ █████          █ \██";
MT 2007 ? #6;" █    ██████████████████]█";
BG 2008 ? #6;"█ ████ █$$$$$█      █^██";
SB 2009 ? #6;"        ████████ ██ █_█";
ME 2010 ? #6;"███████████████████ ██ █Z██";
MM 2011 ? #6;"        ████████ ██ █[█";
FZ 2012 ? #6;"█ ████                █\██";
SO 2013 ? #6;" ███                  █]█";
JP 2014 ? #6;"█ █                   █^██";
NU 2015 ? #6;"                      █_█";
NH 2016 ? #6;"█                     █Z██";
RQ 2017 ? #6;"█████████ █ █████████[█";
DH 2018 ? #6;"█[Z_^]\   █^]\[Z_^ \██";
FW 2019 ? #6;"\███████████████████████]█";
RA 2020 ? #6;"█]^_Z[\]^_Z[\]^_ █^██";
FW 2021 ? #6;"Sq█hMhMf█fqntMc██_█";
YX 2022 ? #6;"████████████████████████████";
JL 2023 RETURN :DATA 52,136,166,10,0,17,2
   3,17,2,1
BM 2049 REM SCREEN #3
TX 2050 ? #6;"████████████████████████████";
IA 2051 ? #6;"██Sgd█qd█k█Sghmf███";
JF 2052 ? #6;"█                     ██";
VZ 2053 ? #6;"        ██    Z[\]^    █";
HX 2054 ? #6;"█       ]█  _       _  ██";
SR 2055 ? #6;"        ^█ ^        Z █";
DC 2056 ? #6;"█       _█ ]   ███   [ ██";
DK 2057 ? #6;"Z_█   Z█ \   ███    \ █";
JD 2058 ? #6;"█[^█   [█ [   ███   ] ██";
RK 2059 ? #6;"\]█   \█ Z          ^ █";
PF 2060 ? #6;"█]\█   ]█  _        _  ██";
AR 2061 ? #6;"^[█   ^█    ^]\[Z    █";
```

continued on next page

```
ZR 2062 ? #6;"■_Z■  _■                ■■";
EM 2063 ? #6;"  ■  Z■■■■■■■■■■■■■■■■";
AF 2064 ? #6;"■_Z■  [■  Z[\]^_Z[ ■■";
MJ 2065 ? #6;"^[■  \■ ■■■■■■■■■■■\■";
KI 2066 ? #6;"■]\■  ]■  ^]\[Z_ ■]■■";
OR 2067 ? #6;"\]■  ^■■■■■■■■■■^■^■";
NX 2068 ? #6;"■[^■  _■[\ ■_Z ■]■_■■";
SH 2069 ? #6;"Z_■  Z ■]^ ■[\ ■Z■";
DF 2070 ? #6;"■ ■■■■■■■■■■■■■■■■■■[■■";
GY 2071 ? #6;"  ■■  [Z_^]\[Z_^]\ ■";
ZM 2072 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
HK 2073 RETURN :DATA 52,136,166,10,0,-1,0
,10,2,21
CT 2099 REM SCREEN #4
XA 2100 ? #6;"■gd ■■rsdm ■■ld ■hrj";
LN 2101 ? #6;"shshk■sdr inbtk■qhsx";
TS 2102 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■■";
RW 2103 ? #6;" Z[\]^_Z[\]^_Z[\] ■";
RX 2104 ? #6;"■_■■■■■■■■■■■■■■■■■■^■■";
GM 2105 ? #6;"^■                      ■_■";
KM 2106 ? #6;"■]■                     ■Z■■";
BK 2107 ? #6;"\■                      ■[■";
ZI 2108 ? #6;"■[■ $$              $$ ■\■■";
DA 2109 ? #6;"Z■                      ■]■";
PH 2110 ? #6;"■_■                     ■^■■";
KZ 2111 ? #6;"^■                      ■■_■";
QP 2112 ? #6;"■]■          $$         ■Z■■";
FX 2113 ? #6;"\■                      ■■[■";
LP 2114 ? #6;"■[■                     ■\■■";
CN 2115 ? #6;"Z■                      ■]■";
DL 2116 ? #6;"■_■ $$              $$ ■^■■";
GX 2117 ? #6;"^■                      ■_■";
KX 2118 ? #6;"■]■                     ■Z■■";
BV 2119 ? #6;"\■                      ■[■";
NF 2120 ? #6;"■[■■■■■■■■■■■■■■■■■■■\■■";
WI 2121 ? #6;" Z_^]\[Z_^]\[Z_^] ■";
YZ 2122 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■■";
JA 2123 RETURN :DATA 52,136,166,10,0,-1,0
,62,16,12
CY 2149 REM SCREEN #5
CX 2150 ? #6;"sgd mdws nmd hr g■qc";
JG 2151 ? #6;"■■■■■■■■■■■■■■■■■■■■■■";
CJ 2152 ? #6;"                        ■";
FQ 2153 ? #6;"■                       ■■";
CR 2154 ? #6;"                        ■";
FY 2155 ? #6;"■                       ■■";
CZ 2156 ? #6;"                        ■";
LE 2157 ? #6;"■      ■■■■    ■■■■     ■■";
KD 2158 ? #6;"    ■■■■■■■  ■■■■■■■   ■";
XR 2159 ? #6;"■   Z ■■ [   [ ■■ Z   ■■";
UP 2160 ? #6;"■ _ ■■ \    \ ■■ _ ■■■";
QI 2161 ? #6;"■■ ^ ■■ ]    ] ■■ ^ ■■■";
UX 2162 ? #6;"■ ] ■■ ^    ^ ■■ ] ■■■";
QQ 2163 ? #6;"■   \ ■■ _  _ ■■ \   ■■";
FN 2164 ? #6;"    [ ■■ Z  Z ■■ [    ■";
WT 2165 ? #6;"■    ■■■■■■■  ■■■■■■■  ■■";
DO 2166 ? #6;"      ■■■■    ■■■■     ■";
GJ 2167 ? #6;"■                       ■■";
DK 2168 ? #6;"                        ■";
GR 2169 ? #6;"■                       ■■";
CH 2170 ? #6;"                        ■";
FO 2171 ? #6;"■                       ■■";
IL 2172 ? #6;"■■■■■■■■■■■■■■■■■■■■■■";
NR 2173 RETURN :DATA 52,136,166,10,0,19,2
2,40,1,11

EF 2199 REM SCREEN #6
TM 2200 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■■";
FP 2201 ? #6;"ZZZZ  ■■■■■■■■■        ■";
VT 2202 ? #6;"■[[[[  ■■■■■■■■■  ,, ■■";
JL 2203 ? #6;"\\\\   ■■■■■■■■  ,,  ■";
JO 2204 ? #6;"■]]]■  ■              ■■";
DA 2205 ? #6;"^^^■   ■        ■,,   ■";
AY 2206 ? #6;"■___■  ■        ■  ,■■";
FG 2207 ? #6;"    ■■ ■        ■   ,■";
TR 2208 ? #6;"■   ■  ■Z[\]^_■ ,,,■■";
LE 2209 ? #6;"    ■  ■■■■■■■■■     ■";
FX 2210 ? #6;"■   ■■   , ,  ,,,,, ■■";
YQ 2211 ? #6;"    ■■■    , ,  , ,  ■";
MU 2212 ? #6;"■   ■■■,, ,         ,■■";
IJ 2213 ? #6;"      ■,   ,  ,  ,     ■";
IP 2214 ? #6;"■     ■              ,■■";
JT 2215 ? #6;"      ■,,,,,   ,,,, ■";
UQ 2216 ? #6;"■     ■■■■■■■■■$$■■■■";
JX 2217 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
ZL 2218 ? #6;"■,,,,,■      ■      ■■";
MH 2219 ? #6;"                       ■";
IS 2220 ? #6;"■ ■■■■■■■■■■■■■■     ■■";
SI 2221 ? #6;"  ^]\[Z_^]■■■■■■■■■■";
HZ 2222 ? #6;"■■■■■■■■■■■■■■■■■■$$■■";
VB 2223 RETURN :DATA 52,136,166,10,0,-1,0
,46,2,21
EK 2249 REM SCREEN #7
NY 2250 ? #6;"xnt g■ud qd■bgdc sgd";
VK 2251 ? #6;"   dmc ne ■dantmc    ";
BG 2252 ? #6;"   ax ■■■■ ■■rsdm    ";
BN 2253 ? #6;"■dkhbhs■shnmr sn xnt";
YL 2254 ? #6;"■trs nmd k■rs rbqddm";
YH 2255 ? #6;"sn g■ud ■ khsskd etm";
AA 2256 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■■";
HS 2257 ? #6;"■Z[\]^_Z[\]^_Z[\]^_■";
GX 2258 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
HB 2259 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
FU 2260 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
FY 2261 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
GC 2262 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
FN 2263 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
RR 2264 ? #6;" ■■■■■■■■  ■■■■■■■■■ ";
FV 2265 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
GS 2266 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
GW 2267 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
HA 2268 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
HE 2269 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
FX 2270 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■";
CZ 2271 ? #6;"■_^]\[Z_^]\[Z_^]\[Z■";
ZQ 2272 ? #6;"■■■■■■■■■■■■■■■■■■■■■■■■■";
UL 2273 RETURN :DATA 52,136,166,10,0,-1,0
,228,10,14
GM 9000 REM CHARACTER DATA
MX 9001 DATA 126,195,129,129,129,129,195,
126
TM 9002 DATA 254,223,175,215,235,245,251,
127
RX 9003 DATA 60,120,124,214,255,135,195,1
26
VI 9004 DATA 126,255,219,255,231,195,231,
126
KO 9005 DATA 6,15,11,153,153,208,240,96
HF 9006 DATA 126,195,129,153,153,129,195,
126
ZF 9007 DATA 254,187,221,175,215,235,245,
127
AR 9008 DATA 60,120,124,214,255,199,255,1
26
RX 9009 DATA 126,239,255,251,209,241,251,
126
BX 9010 DATA 14,31,17,24,24,136,248,112
SO 9011 DATA 126,195,153,189,189,153,195,
126
YC 9012 DATA 254,245,187,221,175,215,235,
127
CR 9013 DATA 60,30,62,107,255,239,255,126

XS 9014 DATA 126,251,241,209,251,255,239,
126
QZ 9015 DATA 28,62,34,56,28,68,124,56
HI 9016 DATA 126,219,189,231,231,189,219,
126
ZI 9017 DATA 254,235,245,187,221,175,215,
127
BB 9018 DATA 60,30,62,107,255,255,255,126

AJ 9019 DATA 126,231,195,231,255,219,255,
126
VL 9020 DATA 120,224,192,120,30,3,7,30
AB 9021 DATA 126,255,231,195,195,231,255,
126
AZ 9022 DATA 254,215,235,245,187,221,175,
127
BP 9023 DATA 60,30,62,107,255,247,255,126

XP 9024 DATA 126,223,143,139,223,255,247,
126
VS 9025 DATA 96,192,192,222,123,3,3,6
BF 9026 DATA 126,231,195,129,129,195,231,
126
ZL 9027 DATA 254,175,215,235,245,187,221,
127
LB 9028 DATA 60,120,124,214,255,231,255,1
26
SV 9029 DATA 126,247,255,223,139,143,223,
126
XS 9030 DATA 0,96,206,219,219,115,6,0
SO 9031 DATA 60,120,124,214,255,131,199,1
26
GN 9032 DATA 120,60,126,86,255,129,195,12
6
AK 9033 DATA 60,30,62,107,255,193,227,126

UD 9034 DATA 60,120,92,214,255,231,195,12
6
BI 9035 DATA 60,30,58,107,255,231,195,126

VU 9036 DATA 0,0,36,60,0,126,60,0
```

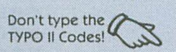
```
BI 9037 DATA 0,0,0,0,0,0,0,0
NI 9038 DATA 255,255,255,255,255,255,255,
   255
NM 9039 DATA 255,255,255,255,255,255,255,
   255
NJ 9040 DATA 255,129,129,129,129,129,129,
   255
WN 9200 DATA 1,64,1,64,1,64,0,0,-1,48,-1,
   48,-1,48,0,0,0,56,0,56,0,56
BS 9300 DATA 104,169,6,162,6,160,10,76,92
   ,228,216,165,5,10,10,10,24,105,48,141,
   2,208,141,3,208,166
NA 9301 DATA 7,160,0,152,157,0,158,157,0,
   159,232,200,192,8,208,244,165,6,10,10,
   10,24,105,32,133
BO 9302 DATA 7,170,160,0,185,56,154,157,0
   ,158,185,88,154,157,0,159,232,200,192,
   8,208,238
WX 9303 DATA 169,136,133,203,169,10,133,2
   04,173,244,2,141,9,212,173,196,2,141,2
   2,208
WL 9304 DATA 76,95,228
PK 9350 DATA 72,216,173,11,212,201,107,17
   6,30,141,10,212,165,203,24
WU 9351 DATA 105,240,141,23,208,133,203,1
   65,204,24,105,16,141,25,208,133,204,17
   3,11
CT 9352 DATA 212,201,108,144,13,141,10,21
   2,169,224,141,9,212,169,28,141,22,208,
   104,64,-1
VI 9400 DATA 104,104,104,133,5,104,104,13
   3,6,104,104,141,56,6,96
UG 9500 DATA 32,12,60,12,35,13,66,13,63,0
   ,57,0
SJ 9800 DATA 14,35,36,38,39,42,43,50,52,5
   5
IV 9900 DATA 194,193,192,192,192,193
BF 9901 DATA 104,104,133,2,104,133,1,104,
   133,4,104,133,3,104,133,6,104,133,5,16
   0,0,240,16,177,1,145,3,230
VW 9902 DATA 1,208,2,230,2,230,3,208,2,23
   0,4,198,5,165,5,201,255,208,232,198,6,
   165,6,201,255,208,224,96
RA 9903 DATA 104,104,104,133,5,104,104,13
   3,6,104,104,141,56,6,104,104,141,244,2
   ,104,104,141,3,210,173,6
VH 9904 DATA 208,133,212,169,0,133,213,96
```

atari spells it out—8-bit or ST

TALKING TYPEWRITER

Article on page 13

LISTING 1




```
RH 2 REM TALKIN' TYPER
ZW 4 REM BY BILL MARQUARDT
FU 6 REM (c) 1986, ANTIC PUBLISHING
PQ 8 REM (DO NOT RENUMBER THIS PROGRAM!)
DH 10 ? CHR$(125):OPEN #3,4,0,"K:"
KO 12 GRAPHICS 2+16:PORTA=54016:PACTL=540
   18
WG 15 P=PEEK(PACTL):POKE PACTL,P-4:REM CL
   EAR BIT 2 = DIRECTION CONTROL MODE
PP 16 POKE PORTA,127:REM BITS 0-6 = OUTPU
   T (SET); BIT 7 = INPUT (CLEAR)
JK 17 POKE PACTL,P:REM RESTORE REGISTER T
   O ORIGINAL VALUE
XJ 20 POSITION 3,6:? #6;"TALKIN' TYPER"
IZ 25 GET #3,K
AU 26 IF K=32 THEN K=1400:GOTO 45
YP 28 IF  NOT (((K>47) AND (K<58)) OR ((K
   >64) AND (K<91))) THEN 20
JF 30 IF (K>47) AND (K<58) THEN K=K-48:K=
   1500+K*10
YM 40 IF (K>64) AND (K<91) THEN K=K-65:K=
   1100+K*10
WV 45 RESTORE K
FM 50 FOR I=1 TO 10:READ D
UO 60 IF PEEK(PORTA)>127 THEN 60
RD 70 POKE PORTA,D+64:POKE PORTA,D
JE 80 IF D=0 THEN I=10
IX 90 NEXT I
RP 100 GOTO 25
NU 500 END
FF 1100 DATA 20,1,0
HA 1110 DATA 63,19,1,0
XK 1120 DATA 55,55,19,1,0
FZ 1130 DATA 33,19,1,0
JK 1140 DATA 19,1,0
GL 1150 DATA 7,7,40,40,1,0
EC 1160 DATA 10,19,1,0
AX 1170 DATA 20,1,2,50,1,0
VH 1180 DATA 24,6,1,0
YO 1190 DATA 10,7,20,1,0
ZU 1200 DATA 42,7,20,1,0
RG 1210 DATA 7,7,62,1,0
QY 1220 DATA 7,7,16,1,0
NZ 1230 DATA 7,7,11,1,0
IK 1240 DATA 53,1,0
YK 1250 DATA 9,19,1,0
TS 1260 DATA 42,49,22,1,0
LN 1270 DATA 59,1,0
OW 1280 DATA 7,7,55,55,1,0
FX 1290 DATA 13,19,1,0
FL 1300 DATA 49,31,1,0
GV 1310 DATA 35,19,1,0
XY 1320 DATA 33,15,1,63,62,49,31,1,0
VE 1330 DATA 7,7,2,41,55,55,1,0
WT 1340 DATA 46,6,1,0
GU 1350 DATA 43,19,1,0
VY 1400 DATA 55,55,9,20,55,1,0
SG 1500 DATA 43,60,53,1,0
TM 1510 DATA 46,15,15,11,1,0
BU 1520 DATA 13,31,1,0
VR 1530 DATA 29,14,19,1,0
TS 1540 DATA 40,40,58,1,0
AL 1550 DATA 40,40,6,35,1,0
SU 1560 DATA 55,55,12,12,2,41,55,1,0
KI 1570 DATA 55,55,7,7,35,12,11,1,0
XV 1580 DATA 20,2,13,1,0
WU 1590 DATA 11,24,6,11,1,0
```

ST RESOURCE

ASSEMBLY LANGUAGE TALKER

Article on page 75

LISTING 1

```
*-------------------------------------*
* Atari ST Talkin' Typer              *
* (c) 1986 Antic Publishing           *
* Version 090886 Monday               *
* Written by Patrick Bass             *
*-------------------------------------*

GEMDOS     equ     1
cr         equ     13
lf         equ     10
esc        equ     27

*GEMDOS calls:
Term       equ     0
Conout     equ     2
Pconout    equ     5
Conin      equ     7
Readline   equ     10
Constat    equ     11
Setblock   equ     74

*-------------------------------------*
start
        move.l     sp,a5
        move.l     #my_stack,sp
        move.l     4(a5),a5
        move.l     $c(a5),d0
        add.l      $14(a5),d0
        add.l      $1c(a5),d0
        add.l      #$100,d0

        move.l     d0,-(sp)
        move.l     a5,-(sp)
        move       d0,-(sp)
        move       #Setblock,-(sp)
        trap       #GEMDOS
        add.l      #12,sp

*-------------------------------------*
_main
        move.l     #titlemess,a0
        bsr        message
*- - - - - - - - - - - - - - - - - - -*
* Watch for any keystrokes.  When
*   encountered, decode keypress.
mainloop
        bsr        scankey
        tst.l      d0
        beq        mainloop

        bsr        decodekey
        bra        mainloop

*- - - - - - - - - - - - - - - - - - -*
* Decide which key was pressed.
decodekey
* Was the Escape Key pressed?
* Branch if it was...
        cmp.b      #esc,d0
        beq        terminate

* Was the Return key pressed?
* Branch if it was...
        cmp.b      #cr,d0
        beq        talk_default

* Was the key between "a" & "z"?
* If lower, try UpperCase.
* If higher, split.
        cmp.b      #"a",d0
        blt        try_uppercase
        cmp.b      #"z",d0
        bgt        alp_over

* Else adjust value for index.
* ...and speak the letter.
        sub.w      #$61,d0
        bsr        say_alphabet
        rts

try_uppercase
* Was the key between "A" & "Z"?
* If lower, try Numbers.
* If higher, split.
        cmp.b      #"A",d0
        blt        try_numbers
        cmp.b      #"Z",d0
        bgt        alp_over

* Else adjust value for index.
* ...and speak the letter.
        sub.w      #$41,d0
        bsr        say_alphabet
        rts

try_numbers
* Was the key between "0" & "9"?
* If not, split.
        cmp.b      #"0",d0
        blt        alp_over
        cmp.b      #"9",d0
        bgt        alp_over

* Else adjust value for index.
* ...and speak the number.
        sub.w      #$30,d0
        bsr        say_numbers
        rts

alp_over
        rts

*-------------------------------------*
talk_default
* Say the Default Phrase.
        movea.l    #speech_table,a0
        move.l     #0,d0
        bra        talker

*- - - - - - - - - - - - - - - - - - -*
say_alphabet
        movea.l    #alphabet,a1
        bra        talk_out

say_numbers
        movea.l    #numbers,a1

* As we enter:
*   a1=address of table.
*   d0=character (to speak) number.
* First multiply d0 by 4 to index
*   on long addresses.
* Then move speech address pointed
*   to into register a0.
talk_out
        asl.w      #2,d0
        movea.l    0(a1,d0.w),a0
        move.l     #0,d0

*---[]                []------------*
talker
* Examine next speech word.
* Is it a zero?
* Branch if not, must be speech.
```

```
        move.w      0(a0,d0.w),d2
        tst.w       d2
        bne         talk_more

        rts
*- - - - - - - - - - - - - - - - - - -*
talk_more
        move.l      a0,-(sp)
        move.l      d0,-(sp)

* Push speech word out printer port.
        move.w      d2,-(sp)
        move.w      #Pconout,-(sp)
        trap        #GEMDOS
        add.l       #4,sp

        move.l      (sp)+,d0
        move.l      (sp)+,a0
        add.l       #2,d0
        bra         talker

*- - - - - - - - - - - - - - - - - - - -*
speech_table
        dc.w    27,7,45,15,53,4,4
        dc.w    24,6,3
        dc.w    26,16,3
        dc.w    26,11,13,12,41,3
        dc.w    16,26,34,15,43,19,11,43,3
        dc.w    13,23,8,12,11,3
        dc.w    13,6,9,51,3
        dc.w    3,3,3,3,0

*-------------------------------------*
alphabet
* A table of letter addresses
*  in letter order.
        dc.l        alph_a, alph_b, alph_c
        dc.l        alph_d, alph_e, alph_f
        dc.l        alph_g, alph_h, alph_i
        dc.l        alph_j, alph_k, alph_l
        dc.l        alph_m, alph_n, alph_o
        dc.l        alph_p, alph_q, alph_r
        dc.l        alph_s, alph_t, alph_u
        dc.l        alph_v, alph_w, alph_x
        dc.l        alph_y, alph_z

*- - - - - - - - - - - - - - - - - - - -*

* A table of letter sound descriptions
*  in letter order.
alph_a      dc.w 20,1,0
alph_b      dc.w 63,19,1,0
alph_c      dc.w 55,55,19,1,0
alph_d      dc.w 21,19,1,0
alph_e      dc.w 19,1,0
alph_f      dc.w 7,7,40,40,1,0
alph_g      dc.w 10,19,1,0
alph_h      dc.w 20,1,2,50,1,0
alph_i      dc.w 24,6,1,0
alph_j      dc.w 10,7,20,1,0
alph_k      dc.w 42,7,20,1,0
alph_l      dc.w 7,7,62,1,0
alph_m      dc.w 7,7,16,1,0
alph_n      dc.w 7,7,11,1,0
alph_o      dc.w 53,1,0
alph_p      dc.w 9,19,1,0
alph_q      dc.w 42,49,22,1,0
alph_r      dc.w 59,1,0
alph_s      dc.w 7,7,55,55,1,0
alph_t      dc.w 13,19,1,0
alph_u      dc.w 49,31,1,0
alph_v      dc.w 35,19,1,0
alph_w      dc.w 33,15,1,63,62,49,31,1,0
alph_x      dc.w 7,7,2,41,55,55,1,0
alph_y      dc.w 46,6,1,0
alph_z      dc.w 43,19,1,0

*- - - - - - - - - - - - - - - - - - - -*
numbers
* A table of number addresses
*  in number order.
        dc.l        alph_0, alph_1, alph_2
        dc.l        alph_3, alph_4, alph_5
        dc.l        alph_6, alph_7, alph_8
        dc.l        alph_9

*- - - - - - - - - - - - - - - - - - - -*
* A table of number sound descriptions
*  in number order.
alph_0      dc.w 43,60,53,1,0
alph_1      dc.w 46,15,15,11,1,0
alph_2      dc.w 13,31,1,0
alph_3      dc.w 29,14,19,1,0
alph_4      dc.w 40,40,58,1,0
alph_5      dc.w 40,40,6,35,1,0
alph_6      dc.w 55,55,12,12,2,41,55,1,0
alph_7      dc.w 55,55,7,7,35,12,11,1,0
alph_8      dc.w 20,2,13,1,0
alph_9      dc.w 11,24,6,11,1,0

*-------------------------------------*
titlemess
        dc.b        "---------------"
        dc.b        "---------------",cr,lf
        dc.b        "ST Talkin' Typ"
        dc.b        "er            "
        dc.b        cr,lf
        dc.b        "(c)1986 Antic "
        dc.b        "Publishing    ",cr,lf
        dc.b        "Written by Pat"
        dc.b        "rick Bass",cr,lf
        dc.b        "--------------"
        dc.b        "--------------"
        dc.b        cr,lf,lf,lf,lf,lf,lf
        dc.b        "Press 'Esc' to quit."
        dc.b        cr,lf,0
        even

*-------------------------------------*
* Exit current program
* and return to GEM/desktop...
terminate
        move.w      #Term,-(sp)
        trap        #GEMDOS

* Whoops!
        addq.l      #2,sp
        rts

*-------------------------------------*
message
        movem.l     d1/a0,-(sp)
        clr.w       d1
mess1
        move.b      (a0)+,d1
        beq         messx

        bsr         charout
        bra         mess1
messx
        movem.l     (sp)+,d1/a0
        rts

*-------------------------------------*
* Write character in d1 to console.
charout
        movem.l     d1-d7/a0-a6,-(sp)
        move.w      d1,-(sp)
        move.w      #Conout,-(sp)
        trap        #GEMDOS
        add.l       #4,sp
        movem.l     (sp)+,d1-d7/a0-a6
        rts

*-------------------------------------*
scankey
        move.w      #Constat,-(sp)
        trap        #GEMDOS
        add.l       #2,sp
        tst.l       d0
        bpl         skipkey
getkey
        move.w      #Conin,-(sp)
        trap        #GEMDOS
        add.l       #2,sp
        rts

skipkey
        clr.l       d0
        rts

*- - - - - - - - - - - - - - - - - - -*
                    bss
                    ds.l        256
my_stack            ds.l        1
                    even
            end
```

SUPER TREK IN ST BASIC

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LISTING 1

```
1000   '
1010   ' ST Super Trek
1020   ' (c) 1986 Antic Publishing
1030   ' Version 100286  Thursday
1040   ' Written by Paul Pratt and Steve Everman
1050   '
1060    HANDLE=2: fullw 2: clearw 2: BELL$=chr$( 7 ): A.BLANK$=chr$( 32 )
1070    TRUE=1: FALSE=0: NONE=0: LEFT=1: RIGHT=2: BOTH=3
1080    ARROW=0: FINGER=3: HOLLOW.CROSSHAIR=6: FILLED.CROSSHAIR=7
1090    randomize 0: QX=294: QY=64: PLX=32: PLY=4: EMPTY=0
1100    STAR=42: KLINGON=221: STARBASE=5: ENTERPRISE=224
1110    ACTIVE=TRUE: HOME=OFF: CO=2: option base 0: RED.ALERT=FALSE
1120    dim MAP%( 8,8 ),SECT%( 8,8 ),KOL%( 6 ),KLING%( 3,3 )
1130    restore 6560: POINTER=ARROW: gosub KOLOR
1140    PLAYING=TRUE: DOSET=OFF: BON=ACTIVE
1150    GRAF.SHRINKBOX=74: GRAF.GROWBOX=73: GRAF.MOUSE=78
1160    color 2: restore AUTHOR.STRING
1170    for X=0 to 16: read Z: gotoxy 2,X: next
1180   AUTHOR.STRING:
1190    data 189,32,80,82,65,84,84,32,38,32,69,86,69,82,77,65,78
1200    GX=10: GY=4: gosub SETUP
1210   '
1220    color 1,2,2,1: PN=6: X=0: gosub POLYLINE
1230    color 1,2,0,1: for X=1 to 30: gosub POLYLINE: next
1240    color 3,2,3,1: PN=2: X=10: gosub POLYLINE
1250    gotoxy 40, 17:  print "%Energy    %Shields     %Date";
1260    gotoxy 40 ,13:  print "%Phaser    %Photon    %Computer"
1270   '
1280    color 1,1,3,1: for Y=1 to 73 step 9: linef 13,Y,157,Y: next
1290    for X=13 to 157 step 18: linef X,1,X,73: next
1300    color 2,1,3,1: for Y=1 to 73 step 9: linef 175,Y,318,Y: next
1310    for X=175 to 319 step 18: linef X,1,X,73: next
1320   '
1330    color 3: gotoxy 45 ,6: print "Phaser        Photon": color 2,2,3,2
1340    for X=0 to 98 step 98
1350       restore PUSH.BOX.DATUM
1360       read X1,Y1,X2,Y2
1370       linef X1+X,Y2,X2+X,Y2: linef X1+X,Y1,X2+X,Y1
1380       linef X1+X,Y1,X1+X,Y2: linef X2+X,Y1,X2+X,Y2
1390       fill X1+X+2,Y1+2
1400    next
1410   PUSH.BOX.DATUM:
1420    data 400,65,455,85
1430   '
1440    restore LIB.BOX.DATUM
1450    read X1,Y1,X2,Y2
1460    linef X1,Y2,X2,Y2: linef X1,Y1,X2,Y1
1470    linef X1,Y1,X1,Y2: linef X2,Y1,X2,Y2
1480   LIB.BOX.DATUM:
1490    data 13,81,319,155
1500   '
1510    restore STAT.BOX.DATUM
1520    read X1,Y1,X2,Y2
1530    linef X1,Y2,X2,Y2: linef X1,Y1,X2,Y1
1540    linef X1,Y1,X1,Y2: linef X2,Y1,X2,Y2
1550   STAT.BOX.DATUM:
1560    data 350,50,606,1
1570   '
1580    color 1: restore PSTRING.001: gosub PRSTRING
1590    color 2: restore PSTRING.002: gosub PRSTRING
```

TYPO ST codes for Super Trek

Don't type these

```
1000 :00F2
1010 :0535
1020 :087A
1030 :0856
1040 :0E59
1050 :00ED
1060 :108E
1070 :0C30
1080 :0FBE
1090 :0DB3
1100 :0CCE
1110 :10B3
1120 :0AC2
1130 :0C9E
1140 :0A3A
1150 :0D89
1160 :0A2F
1170 :0BE2
1180 :04DC
1190 :0C74
1200 :0736
1210 :00EB
1220 :0B3E
1230 :0E79
1240 :0B70
1250 :0E73
1260 :0FAB
1270 :00F1
1280 :1036
1290 :0CC1
1300 :1068
1310 :0CF3
1320 :00ED
1330 :11F4
1340 :0655
1350 :07CD
1360 :0512
1370 :0C85
1380 :0C86
1390 :04F0
1400 :0284
1410 :0500
1420 :04EF
1430 :00EF
1440 :0764
1450 :0512
1460 :0A79
1470 :0A7A
1480 :049E
1490 :04F1
1500 :00ED
1510 :07C7
1520 :0510
1530 :0A77
1540 :0A78
1550 :0501
1560 :04B4
1570 :00F4
1580 :0E15
1590 :0E18
```

```
1600  '
1610  MAIN:
1620   while PLAYING
1630      DATE=0: PI=0: SHE=0: COMP=0: PHASE=0: PHOT=0: TMPDAM=0
1640      gosub CLEAN: gosub ALT.XREPAIR
1650      gosub ALT.LIBRARY: gosub ALT.GALAXY
1660      color 2: gotoxy 42,1: print "Sir, there are";FOE;"Klingons"
1670      color 2: gotoxy 42,2: print "  and 360 days to kill them."
1680      color 1: gotoxy 45,4: print " G O O D   L U C K  !"
1690  '
1700      while BUTTON<>BOTH and PI<3600 and DATE<3600 and FOE>0
1710        gosub GET.MOUSE: IN.RANGE=FALSE
1720        if MY<95 and MY>22 and BUTTON=LEFT then IN.RANGE=TRUE
1730        if MX>13 and MX<157 and IN.RANGE then gosub GALAXY
1740        if MX>175 and MX< 319 and IN.RANGE then gosub MOVESHIP
1750        if MX>13 and MX<319 and MY>102 and MY<178 then gosub LIBRARY
1760        if MX>498 and MX<553 and MY>86 and MY<107 then gosub PHOTON
1770        if MX>400 and MX<453 and MY>86 and MY<107 then gosub PHASER
1780      wend
1782  '
1790      color 2: restore COLOR.STRING.3: gosub KOLOR: gosub CLEAN
1800      IT=( FOE=0 )*-1+( DATE>=3600 )*-2+( PI>=3600 )*-3
1810      on IT gosub SUCCESS,FAILURE,INCOMPETENCE,SUCCESS,FAILURE
1820      for X=10 to 16 step 2
1830         gotoxy 2,X: print "                                              "
1840      next
1850      gotoxy 2,11: print  " Will you accept another commission?"
1860      color 3: gotoxy 2,13
1870      print  "           Left Button for    ";: color 1
1872      print "YES          "
1880      color 3: gotoxy 2,15
1890      print  "           Right Button for  ";: color 1
1892      print " NO          "
1900      gosub GET.MOUSE
1910      while BUTTON=NONE or BUTTON=BOTH or FALL=FALSE
1920           gosub GET.MOUSE
1930      wend
1940      if BUTTON=RIGHT then PLAYING=FALSE
1950      if BUTTON=LEFT then gosub MORE
1960   wend
1970  end
1980  '
1990  SUCCESS:
2000   restore COLOR.STRING.4
2010   for X=0 to 12
2020      gosub KOLOR
2030      gotoxy 2,9
2032      print "   Congratulations! Invasion Stopped! ";BELL$
2040   next
2050   restore COLOR.STRING.0: gosub KOLOR: HCAP=HCAP+5
2060  return
2070  '
2080  FAILURE:
2090   gotoxy 2,9: print " You Failed. ";FOE;"Klingons remain. "
2100   HCAP=HCAP-6
2110  return
2120  '
2130  INCOMPETENCE:
2140   gotoxy 2,9: print " Found drifting: Systems Dead   "
2142   HCAP=HCAP-6
2150  return
2160  '
2170  MORE:
2180   gosub CLEAN
2182   gotoxy 43,4: print "Stand By for Assignment";BELL$
2190   gosub ALT.LIBRARY: gosub SETUP: color 1,0,0,0
2200   for Y=3 to 72 step 9
2210      for X=15 to 155 step 18
2220          fill X,Y
2230     next
2240   next
2250  return
2260  '
2270  PIE:
2280   color 1,1,2,1
```

1600	:00EE
1610	:0227
1620	:04F6
1630	:0D56
1640	:09D2
1650	:0B3F
1660	:12F3
1670	:115A
1680	:0BF0
1690	:00F7
1700	:0F06
1710	:0994
1720	:0F39
1730	:0E8C
1740	:0F6B
1750	:10D7
1760	:10AF
1770	:1089
1780	:027E
1782	:00F9
1790	:11E3
1800	:0A0D
1810	:10D0
1820	:0640
1830	:06D7
1840	:028C
1850	:13B9
1860	:06C7
1870	:0B54
1872	:0434
1880	:06CB
1890	:0BC9
1892	:03E2
1900	:0581
1910	:0DFC
1920	:0583
1930	:027B
1940	:0A9F
1950	:09E4
1960	:027E
1970	:0208
1980	:00F9
1990	:0326
2000	:07AC
2010	:0415
2020	:046B
2030	:0406
2032	:115B
2040	:0285
2050	:0E9D
2060	:0368
2070	:00F0
2080	:030C
2090	:11EA
2100	:039B
2110	:0364
2120	:00EC
2130	:047A
2140	:10A6
2142	:03A1
2150	:0368
2160	:00F0
2170	:0237
2180	:044E
2182	:107C
2190	:0D99
2200	:0615
2210	:06AA
2220	:034A
2230	:0286
2240	:0287
2250	:0369
2260	:00F1
2270	:01E3
2280	:0434

continued on next page

```
2290   pcircle 383, 140, 25, 0, PI
2300   pcircle 573, 140, 25, 0, DATE
2310   pcircle 573, 103, 25, 0, COMP*36
2320   pcircle 383, 103, 25, 0, PHASE*36
2330   pcircle 478, 103, 25, 0, PHOT
2340   pcircle 478, 140, 25, 0, SHE*36
2350  return
2360  '
2370  GET.MOUSE:
2380   GINTOUT=peek( A#+12 ): gemsys( 79 )
2390   MX=peek( GINTOUT+2 ): MY=peek( GINTOUT+4 )
2400   BUTTON=peek( GINTOUT+6 )
2410   if OLDBUTTON<>BUTTON then FALL=TRUE else FALL=FALSE
2420   OLDBUTTON=BUTTON
2430  return
2440  '
2450  ENGY:
2460   gosub CLEAN
2470   color 1: gotoxy 44,4: print "Energy Level too Low!";BELL$
2480  return
2490  '
2500  GALAXY:
2510   X=2*int( MX/18+.27 ): Y=int( MY/9-.5 )-2: gosub CLEAN
2520   DIST=int( sqr( ( ( X-GX )/2 )^2+( Y-GY )^2 ) )
2530   TDIST=DIST*500: if DIST=1 then TDIST=30
2540   if PI+TDIST>3599 then gosub ENGY: return
2550   PI=PI+TDIST: DATE=DATE+DIST*4
2560   gotoxy GX,GY: print A.BLANK$: color 1,0,2
2570   if MK=ACTIVE then MK=OFF: color 1,2,2
2580   for E=-2 to 8 step 5: fill int( GX*9 )+E,int( GY*9 )+2: next
2590   GX=X: GY=Y
2600   MAP.SPOT= MAP%( GY,( GX-2 )/2 )
2610  ALT.GALAXY:
2620   if MAP.SPOT<0 then MAP%( GY,( GX-2 )/2 )=MAP.SPOT*-1-1
2630   color 2: gotoxy GX,GY: print chr$( ENTERPRISE )
2640   gosub SHRINKBOX
2650   gosub GROWBOX: gosub REC: gosub GROWBOX
2660   if RED.ALERT=TRUE and PI>0 then gosub REBUTAL
2670   gosub SET
2680  return
2690  '
2700  GETSHIP:
2710   if BON=ACTIVE then BON=OFF: gosub CLEAN
2720   gosub REBUTAL: gosub SET.MOUSE.SHAPE: gosub SHOW
2730   while MX<175 or MX>319 or MY>95 or MY<22 or BUTTON<>LEFT
2740      gosub GET.MOUSE
2750   wend
2760   PI=PI+55: TX=2*int( MX/18+.27 ): TY=int( MY/9-.5 )-2
2770   for Z=0 to 2
2780      if KLING%( Z,0 )=( TX-20 )/2 and KLING%( Z,1 )=TY then SHP=Z
2790   next
2800   DIST=int( SQR( ( ( TX-PLX )/2 )^2+( TY-PLY )^2 )^2.3 )
2810  return
2820  '
2830  PHOTON:
2840   if BUTTON<>LEFT or FALL=0 or ( RED.ALERT=FALSE ) then return
2850   if PHOT>3100 then gosub CLEAN
2860   if PHOT>3100 then gotoxy 44,2: print "No Photon Bombs": return
2870   PHOT=PHOT+600: POINTER=HOLLOW.CROSSHAIR: gosub GETSHIP
2880   DAMAGE=25+int( RND*200 )-DIST*2: color 2: gosub ALT.PHASER
2890  return
2900  '
2910  PHASER:
2920   if BUTTON<>LEFT or FALL=FALSE or RED.ALERT=FALSE then return
2930   if PHASE>99 then color 1: gotoxy 46,1: ?"No Phasers": return
2940   DAMAGE=40+( rnd*200 )-DIST*4-PHASE/1.2-( COMP/1.7 ): color 2
2950   POINTER=FILLED.CROSSHAIR: gosub GETSHIP
2960  ALT.PHASER:
2970   if SECT%( ( TX-20 )/2,TY )<>KLINGON then DAMAGE=FALSE
2980   if DAMAGE<15 then gotoxy 40,4: ? "          M I S S          "
2990   if DAMAGE<15 then gosub SET: return
3000   KLING%( SHP,2 )=KLING%( SHP,2 )-DAMAGE
3010   if KLING%( SHP,2 )<1 then NUMBER.KLINGONS=NUMBER.KLINGONS-1
3020   if KLING%( SHP,2 )<1 then gosub DESTROY: return
3030   restore COLOR.STRING.2: gosub KOLOR
```

```
2290 :06C2
2300 :0740
2310 :07E4
2320 :0826
2330 :0763
2340 :079D
2350 :036A
2360 :00F2
2370 :039D
2380 :09AF
2390 :0BC9
2400 :0760
2410 :0F62
2420 :059C
2430 :0369
2440 :00F1
2450 :0238
2460 :044F
2470 :11F9
2480 :036E
2490 :00F6
2500 :02C7
2510 :0D7A
2520 :0A66
2530 :0B04
2540 :0CDA
2550 :085E
2560 :0C88
2570 :0AD3
2580 :1013
2590 :0374
2600 :0727
2610 :03D8
2620 :0D4B
2630 :0E85
2640 :05A4
2650 :0CCB
2660 :0DB3
2670 :03DB
2680 :0370
2690 :00F8
2700 :0317
2710 :0BD4
2720 :0F31
2730 :0F80
2740 :0584
2750 :027C
2760 :0CAA
2770 :03F3
2780 :0E5B
2790 :0291
2800 :0C4A
2810 :036B
2820 :00F3
2830 :02DF
2840 :1135
2850 :090D
2860 :13A8
2870 :0FFC
2880 :0FF0
2890 :0373
2900 :00F2
2910 :02C9
2920 :121E
2930 :1292
2940 :0EA5
2950 :0C28
2960 :03DD
2970 :0D8E
2980 :0AF9
2990 :0B79
3000 :0934
3010 :1036
3020 :0E08
3030 :0B8F
```

```
3040  for D=0 to 20: next
3050  restore COLOR.STRING.1: gosub KOLOR: gotoxy 41,4
3060  HIT.AT=KLING%( SHP,2 )/2
3070  print using "Hit: Klingon at ###.#_% power";HIT.AT: print BELL$
3080  '
3090 SET:
3100  POINTER=ARROW: gosub SET.MOUSE.SHAPE
3110  gosub SHOW: gosub GET.MOUSE: gosub PIE
3120 return
3130 '
3140 CLEAN:
3150  for E=1 to 4
3160     gotoxy 40,E: print "                              "
3170  next
3180 return
3190 '
3200 DESTROY:
3210  gotoxy ( KLING%( SHP,0 )+10 )*2,KLING%( SHP,1 ): print A.BLANK$
3220  FOE=FOE-1: for X=0 to 8: gosub FLASH: next
3230  restore COLOR.STRING.0: gosub KOLOR: RED.ALERT=FALSE
3240  for X=0 to 5
3250     CO=CO+1: color CO: if CO=3 then CO=1
3260     gotoxy 40,4: print "       Klingon Destroyed       ";BELL$
3270  next
3280  if NUMBER.KLINGONS>0 then restore COLOR.STRING.1
3290  if NUMBER.KLINGONS>0 then gosub KOLOR: RED.ALERT=TRUE
3300  SECT%( ( TX-20 )/2,TY )=FALSE
3310  MAP%( GY,( GX-2 )/2 )=MAP%( GY,( GX-2 )/2 )-10
3320  if KEP=OFF then gosub CLEAN: gosub SET else KEP=OFF: gosub SET
3330  gosub REDALERT
3340 return
3350 '
3360 REBUTAL:
3370  if int( rnd*12 )<5 and NUMBER.KLINGONS<2 then return
3380  if BON=ACTIVE then BON=OFF: gosub CLEAN
3390  sound 1,12,3,4,0
3400  CO=CO+1: color CO: if CO=3 then CO=1
3410  DAM=int( rnd*11+SHE/4-DIST/5 )
3412  if DAM<1 then DAM=int( rnd*5 )+1
3420  if NUMBER.KLINGONS>1 then DAM=int( DAM*( NUMBER.KLINGONS/1.4 ) )
3430  on rnd*3+1 gosub HIT.SHIELDS,HIT.PHASERS,HIT.COMPUTER
3440  sound 1,0,0,0,0
3450 return
3460 '
3470 HIT.SHIELDS:
3480  SHE=SHE+DAM : if SHE>100 then SHE=100: gosub EMINENT: return
3490  gotoxy 40,2: print "   Shields took";DAM;"% damage.": return
3492 '
3500 HIT.PHASERS:
3510  PHASE=PHASE+DAM: if PHASE>100 then PHASE=100
3520  gotoxy 40,2: print "   Phaser took";DAM;"% damage.": return
3522 '
3530 HIT.COMPUTER:
3540  COMP=COMP+DAM
3542  if COMP>100 then COMP=100: gosub EMINENT: return
3550  gotoxy 40,2: print "   Computer took";DAM;"% damage.  ": return
3560 '
3570 EMINENT:
3580  TMPDAM=TMPDAM+DAM: gosub CLEAN
3590  color 2: gotoxy 44,1: print "DANGER! Systems Weak";BELL$
3600  X=int( RND*10 )+1: gotoxy 43,2
3610  print X;"Days used for repair.": DATE=DATE+X*10
3620  color 1
3630  if TMPDAM>50 then gotoxy 40,3: print " DANGER! System Warning. "
3640  if TMPDAM>90 then PI=3700
3650  color 2
3660 return
3670 '
3680 REC:
3690  restore COLOR.STRING.0: gosub KOLOR: HOME=OFF: RED.ALERT=FALSE
3700  for X=0 to 7
3710     for Y=0 to 7
3720          gotoxy ( X+10 )*2,Y: print A.BLANK$: SECT%( X,Y )=EMPTY
3730     next
3740  next
```

3040	:05FD
3050	:0F39
3060	:0643
3070	:133C
3080	:00F2
3090	:01F2
3100	:0B49
3110	:0C4F
3120	:0366
3130	:00EE
3140	:0265
3150	:03DA
3160	:06F4
3170	:028A
3180	:036C
3190	:00F4
3200	:0329
3210	:0F9C
3220	:0C38
3230	:0FF2
3240	:03ED
3250	:0A2C
3260	:0EE7
3270	:028B
3280	:0EFC
3290	:0FF5
3300	:06D9
3310	:0932
3320	:12EE
3330	:053C
3340	:036A
3350	:00F2
3360	:0315
3370	:0FC6
3380	:0BD8
3390	:04D3
3400	:0A29
3410	:0876
3412	:0931
3420	:1128
3430	:0FE6
3440	:0495
3450	:036C
3460	:00F4
3470	:0427
3480	:1122
3490	:1288
3492	:00F9
3500	:042B
3510	:0C1C
3520	:1219
3522	:00F3
3530	:0487
3540	:0464
3542	:0E8B
3550	:1308
3560	:00F5
3570	:0319
3580	:094D
3590	:1146
3600	:086E
3610	:0EC9
3620	:031B
3630	:1323
3640	:0755
3650	:031F
3660	:036F
3670	:00F7
3680	:01E5
3690	:1277
3700	:03F0
3710	:03F2
3720	:0E76
3730	:028C
3740	:028D

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```
3750   SECT%( ( PLX-20 )/2,PLY )=ENTERPRISE: X=( GX-2 )/2: Y=GY
3760   TOTAL.BASES=int( MAP%( Y, X )/100 )
3770   NUMBER.KLINGONS=int( MAP%( Y,X )/10 )-( TOTAL.BASES*10 )
3780   NUMBER.STARS=MAP%( Y,X )-(NUMBER.KLINGONS*10)-(TOTAL.BASES*100)
3790   Z=0: color 1
3800   while Z<TOTAL.BASES
3810      X=int( rnd*8 ): Y=int( rnd*8 ): IT=SECT%( X,Y )
3820      if IT=0 then SECT%( X,Y )=STARBASE: Z=Z+1
3830      if IT=0 then gotoxy( X+10 )*2,Y: print chr$( STARBASE )
3840   wend
3850   Z=0: color 2
3860   while Z<NUMBER.KLINGONS
3870      X=int( rnd*8 ): Y=int( rnd*8 )
3880      if SECT%( X,Y )=0 then gosub ALERT
3890   wend
3900   Z=0: color 3
3910   while Z<NUMBER.STARS
3920      X=int( rnd*8 ): Y=int( rnd*8 ): IT=SECT%( X,Y )
3930      if IT=0 then SECT%( X,Y )=STAR: Z=Z+1
3940      if IT=0 then gotoxy ( X+10 )*2,Y: print chr$( STAR )
3950   wend
3960   color 1: gotoxy PLX,PLY: print chr$( ENTERPRISE )
3970   '
3980  REDALERT:
3990   restore RED.MESSAGE
4000   if RED.ALERT=FALSE then color 0: gosub PRSTRING: return
4010   color 2: gosub PRSTRING: restore COLOR.STRING.1: gosub KOLOR
4020   RED.ALERT=TRUE
4030  return
4040   '
4050  ALERT:
4060   KLING%( Z,0 )=X: KLING%( Z,1 )=Y: KLING%( Z,2 )=200
4070   RED.ALERT=TRUE
4080   SECT%( X,Y )=KLINGON: Z=Z+1
4090   gotoxy ( X+10 )*2, Y: print chr$( KLINGON )
4100  return
4110   '
4120  LIBRARY:
4130   POINTER=FINGER: gosub SET.MOUSE.SHAPE
4140   while MX>13 and MX<319 and MY>102 and MY<178
4150      gosub GET.MOUSE
4160      if BUTTON=LEFT then gosub DO.LIBRARY
4170   wend
4180   if WR=OFF then POINTER=ARROW: gosub SET.MOUSE.SHAPE: return
4190  ALT.LIBRARY:
4200   color 2
4210   gotoxy 2,9:  print "  L i b r a r y   F u n c t i o n s   "
4220   gotoxy 2,10: print "______________________________________"
4230   gotoxy 2,11: print "     Status & Repair Scheduling       "
4240   gotoxy 2,12: print "    Cumulative Galactic Record        "
4250   gotoxy 2,13: print "   Long Range Galactic Scanning       "
4260   gotoxy 2,14: print "     Leave Marker Buoy Behind         "
4270   gotoxy 2,15: print "                                      "
4280   color 3
4290   gotoxy 2,16: print "   Exit Library to clear Function     "
4300   POINTER=ARROW: gosub SET.MOUSE.SHAPE: WR=OFF
4310  return
4320   '
4330  DO.LIBRARY:
4340   if MY>120 and MY<130 then WR=ACTIVE: gosub REPAIR
4350   if MY>130 and MY<140 then WR=ACTIVE: gosub GALAXYMAP
4360   if MY>140 and MY<150 then WR=ACTIVE: gosub SCAN.GALAXY
4370   if FALL=1 and MY>149 and MY<160 then gosub SET.MARKER.BUOY
4380  return
4390   '
4400  SCAN.GALAXY:
4410   gosub SCAN: gosub GALAXYMAP: gosub SCAN
4420  return
4430   '
4440  SET.MARKER.BUOY:
4450   gosub CLEAN: gotoxy 50,2: print " Buoy Set ";BELL$
4460   MK=ACTIVE
4470  return
4480   '
4490  GALAXYMAP:
```

3750	:0CF7
3760	:08BA
3770	:0DF0
3780	:1082
3790	:0424
3800	:069A
3810	:0C4B
3820	:0AF0
3830	:0F84
3840	:027D
3850	:0422
3860	:07DC
3870	:08BB
3880	:09D8
3890	:0282
3900	:041F
3910	:0700
3920	:0C4D
3930	:09D7
3940	:0E6B
3950	:027F
3960	:0F35
3970	:00FA
3980	:0361
3990	:06E7
4000	:1167
4010	:12EB
4020	:04C4
4030	:0367
4040	:00EF
4050	:027B
4060	:0B1E
4070	:04C9
4080	:0724
4090	:0BB8
4100	:0365
4110	:00ED
4120	:0316
4130	:0B7D
4140	:0C39
4150	:0581
4160	:0B83
4170	:027A
4180	:126B
4190	:042C
4200	:0317
4210	:0D41
4220	:1497
4230	:0FF1
4240	:1076
4250	:10A8
4260	:0F1C
4270	:06E6
4280	:0320
4290	:1188
4300	:0D47
4310	:0368
4320	:00F0
4330	:03DA
4340	:0E28
4350	:0F0C
4360	:0F84
4370	:10A3
4380	:036F
4390	:00F7
4400	:041B
4410	:0C8B
4420	:036A
4430	:00F2
4440	:054F
4450	:0EEB
4460	:035F
4470	:036F
4480	:00F7
4490	:03AF

```
4500   if FALL<>1 then return
4510   for Y=9 to 16
4520     gotoxy 2,Y: print "                                        "
4530   next
4540   color 3
4550   for X=0 to 7
4560     for Y=0 to 7
4570        if GY=X and ( GX-2 )/2=Y then color 2
4580        gotoxy 2+4*Y,X+9
4590        if MAP%(X,Y)<0 then print " ..." else print  MAP%(X,Y)
4600        IT=int( rnd*( 500-COMP ) )
4610        if IT<5*COMP then gotoxy 2+4*Y,X+9: print  " .?."
4620        color 3
4630     next
4640   next
4650  return
4660  '
4670  SCAN:
4680   if PI+1200 >3600 then gosub ENGY: return
4690   for Y=GX/2-2 to GX/2
4700     for X=GY-1 to GY+1
4710        if X>7 or X<0 or Y>7 or Y<0 then 4730
4720        if GY<>X or (GX-2)/2<>Y then MAP%(X,Y)=MAP%(X,Y)*-1-1
4730     next
4740   next
4750   PI=PI+600: gosub PIE
4760  return
4770  '
4780  MOVESHIP:
4790   if FALL=0 then return
4800   gosub CLEAN: if RED.ALERT=TRUE then gosub REBUTAL
4810   X=2*int( MX/18+.27 ): Y=int( MY/9-.5 )-2
4820   color 1
4830   IT=SECT%(( X-20 )/2, Y )
4840   if IT=STAR or IT=KLINGON then gotoxy 44,4
4842   if IT=STAR then print "Sir, that's a Star.": return
4852   if IT=KLINGON then print "Sir, that's a Klingon.": return
4860   QX=MX: QY=MY
4870   if HOME=OFF then gotoxy PLX,PLY: print A.BLANKS$
4880   DIST=int( sqr( ( X-PLX )^2+( Y-PLY )^2 ) )^2.10: PI=PI+DIST
4890   PLX=X: PLY=Y
4900   if ( BX<>PLX or BY<>PLY ) and HOME=ACTIVE then HOME=OFF
4910   if IT=STARBASE then gosub DOCK
4920   if HOME=OFF then gotoxy PLX,PLY: print chr$( ENTERPRISE )
4930   gosub SET
4940  return
4950  '
4960  DOCK:
4970   PHOT=0: PI=0: gosub ALT.XREPAIR: gosub PIE
4980   HOME=ACTIVE: color 1
4990   gotoxy 44,1: print "Welcome to Star Base";BELL$
5000   if RED.ALERT=FALSE then restore COLOR.STRING.0: gosub KOLOR
5010   if RED.ALERT=FALSE then gotoxy 46,2: print " Repair Available "
5020   BX=PLX: BY=PLY: BON=ACTIVE
5030  return
5040  '
5050  REPAIR:
5060   CS=int( 100-COMP ): PS=int( 100-PHASE )
5070   TS=int( 100-TOR ): SS=int( 100-SHE )
5080   CG=CS: SG=SS: TG=TS: PG=PS
5090   color 2
5100   gosub STATUS
5110   gosub SHOW.STATUS.LINE
5120   gosub UPDATE.SHIELDS
5130   gosub UPDATE.PHASERS
5140   gosub STAT.UPDATE
5150   gosub SHOW.AUTHORIZATION.MESSAGE
5160   while MX>13 and MX<319 and MY>102 and MY<178
5170     color int( rnd*3 )+1
5180     if SG>90 or SG<SS+6 then S=1 else S=5
5190     if PG>90 or PG<PS+6 then P=1 else P=5
5200     if CG>90 or CG<CS+6 then C=1 else C=5
5210     if RED.ALERT=TRUE then gotoxy 2,15
5220     if RED.ALERT=TRUE then print "Repair Crew at Battle Stations"
5230     color 3: gosub GET.MOUSE
```

4500	:07B1
4510	:042A
4520	:06D7
4530	:028B
4540	:031F
4550	:03F4
4560	:03F6
4570	:0A4D
4580	:0577
4590	:0EEF
4600	:06F0
4610	:0D9C
4620	:031E
4630	:028C
4640	:028D
4650	:036F
4660	:00F7
4670	:0230
4680	:0C0B
4690	:05F2
4700	:0584
4710	:09DF
4720	:0DA6
4730	:028D
4740	:028E
4750	:0638
4760	:0371
4770	:00F9
4780	:0378
4790	:077E
4800	:0F34
4810	:09C2
4820	:031E
4830	:056C
4840	:0CA1
4842	:107D
4852	:128E
4860	:0424
4870	:0EB3
4880	:0E90
4890	:0423
4900	:0F25
4910	:09BC
4920	:1167
4930	:03DC
4940	:0371
4950	:00F9
4960	:022E
4970	:0C78
4980	:0681
4990	:0F32
5000	:1233
5010	:136E
5020	:07AB
5030	:0368
5040	:00F0
5050	:02C7
5060	:0A0C
5070	:0956
5080	:074B
5090	:031F
5100	:04CA
5110	:0790
5120	:06E5
5130	:06F0
5140	:0617
5150	:0A7E
5160	:0C3C
5170	:0685
5180	:0A7A
5190	:0A6C
5200	:0A23
5210	:0AB2
5220	:1430
5230	:080D

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```
5240        if BUTTON=LEFT then gosub DO.LEFT
5250        if BUTTON=RIGHT then gosub DO.RIGHT
5260     wend
5270   return
5280   '
5290   DO.LEFT:
5300    if TMPI>20 and TMPT>20 then gosub MORE.LEFT
5310    if MY>145 and MY<180 then gosub XREPAIR: gosub PIE: MY=10
5320   return
5330   '
5340   MORE.LEFT:
5350    if MY>110 and MY<120 and CG<=99 then gosub C.LEFT
5360    if MY>120 and MY<130 and SG<=99 then gosub S.LEFT
5370    if MY>130 and MY<140 and PG<=99 then gosub P.LEFT
5380   return
5390   '
5400   DO.RIGHT:
5410    if MY>110 and MY<120 and CG>CS then gosub C.RIGHT
5420    if MY>120 and MY<130 and SG>SS then gosub S.RIGHT
5430    if MY>130 and MY<140 and PG>PS then gosub P.RIGHT
5440   return
5450   '
5460   C.LEFT:
5470    CG=CG+C: TMPDAM=0: gosub STATUS
5480    gosub UPDATE.COMPUTER: gosub STAT.UPDATE
5490   return
5500   '
5510   S.LEFT:
5520    SG=SG+S: TMPDAM=0: gosub STATUS
5530    gosub UPDATE.SHIELDS: gosub STAT.UPDATE
5540   return
5550   '
5560   P.LEFT:
5570    PG=PG+P: gosub STATUS
5580    gosub UPDATE.PHASERS: gosub STAT.UPDATE
5590   return
5600   '
5610   C.RIGHT:
5620    CG=CG-C: gosub STATUS
5630    gosub UPDATE.COMPUTER: gosub STAT.UPDATE
5640   return
5650   '
5660   S.RIGHT:
5670    SG=SG-S: gosub STATUS
5680    gosub UPDATE.SHIELDS: gosub STAT.UPDATE
5690   return
5700   '
5710   P.RIGHT:
5720    PG=PG-P: gosub STATUS
5730    gosub UPDATE.PHASERS: gosub STAT.UPDATE
5740   return
5750   '
5760   STATUS:
5770    NPI=int( ( 3600-PI )/10 ): NDATE=int( ( 3600-DATE )/10 )
5780    CE=int( ( CG-CS )*1.5 )
5782    SE=int( ( SG-SS )*1.7 )
5790    PE=int( ( PG-PS )*1.6 )
5800    CT=int( ( CG-CS )*0.5 )
5802    ST=int( ( SG-SS )*.34 )
5810    PT=int( ( PG-PS )*.42 )
5820    TOTE=int( CE+SE+PE+TE )
5822    TOTT=int( CT+ST+PT+TT )
5830    if HOME=ACTIVE then TOTE=0
5840    TMPI=NPI-TOTE: TMPT=NDATE-TOTT
5850   return
5860   '
5870   SHOW.STATUS.LINE:
5880    color 2
5890    gotoxy 2,9: print "             STATUS   GOAL   ENERGY   DAYS"
5900    color 3
5910   '
5920   UPDATE.COMPUTER:
5930    gotoxy 2,10: print " Computer->  ";
5940    print using"####_%  ";CS,CG;
5942    print using"   ####";CE,CT: return
```

```
5240 :0A99
5250 :0B40
5260 :027B
5270 :036E
5280 :00F6
5290 :02F6
5300 :0CE4
5310 :1064
5320 :036A
5330 :00F2
5340 :0392
5350 :0DCD
5360 :0DF0
5370 :0DED
5380 :0370
5390 :00F8
5400 :0342
5410 :0E06
5420 :0E39
5430 :0E33
5440 :036D
5450 :00F5
5460 :02A5
5470 :0937
5480 :0CD8
5490 :0372
5500 :00F1
5510 :02B1
5520 :0963
5530 :0C71
5540 :036E
5550 :00F6
5560 :02B3
5570 :06F5
5580 :0C80
5590 :0373
5600 :00F2
5610 :02F5
5620 :06CC
5630 :0CD5
5640 :036F
5650 :00F7
5660 :030A
5670 :0701
5680 :0C77
5690 :0374
5700 :00F3
5710 :0303
5720 :06F4
5730 :0C7D
5740 :0370
5750 :00F8
5760 :02F0
5770 :0C77
5780 :0591
5782 :05C5
5790 :05BA
5800 :0598
5802 :05CC
5810 :05C1
5820 :06B3
5822 :0700
5830 :0819
5840 :0938
5850 :0372
5860 :00FA
5870 :05B7
5880 :0326
5890 :0CC4
5900 :0320
5910 :00F6
5920 :056A
5930 :0ADA
5940 :0818
5942 :0A34
```

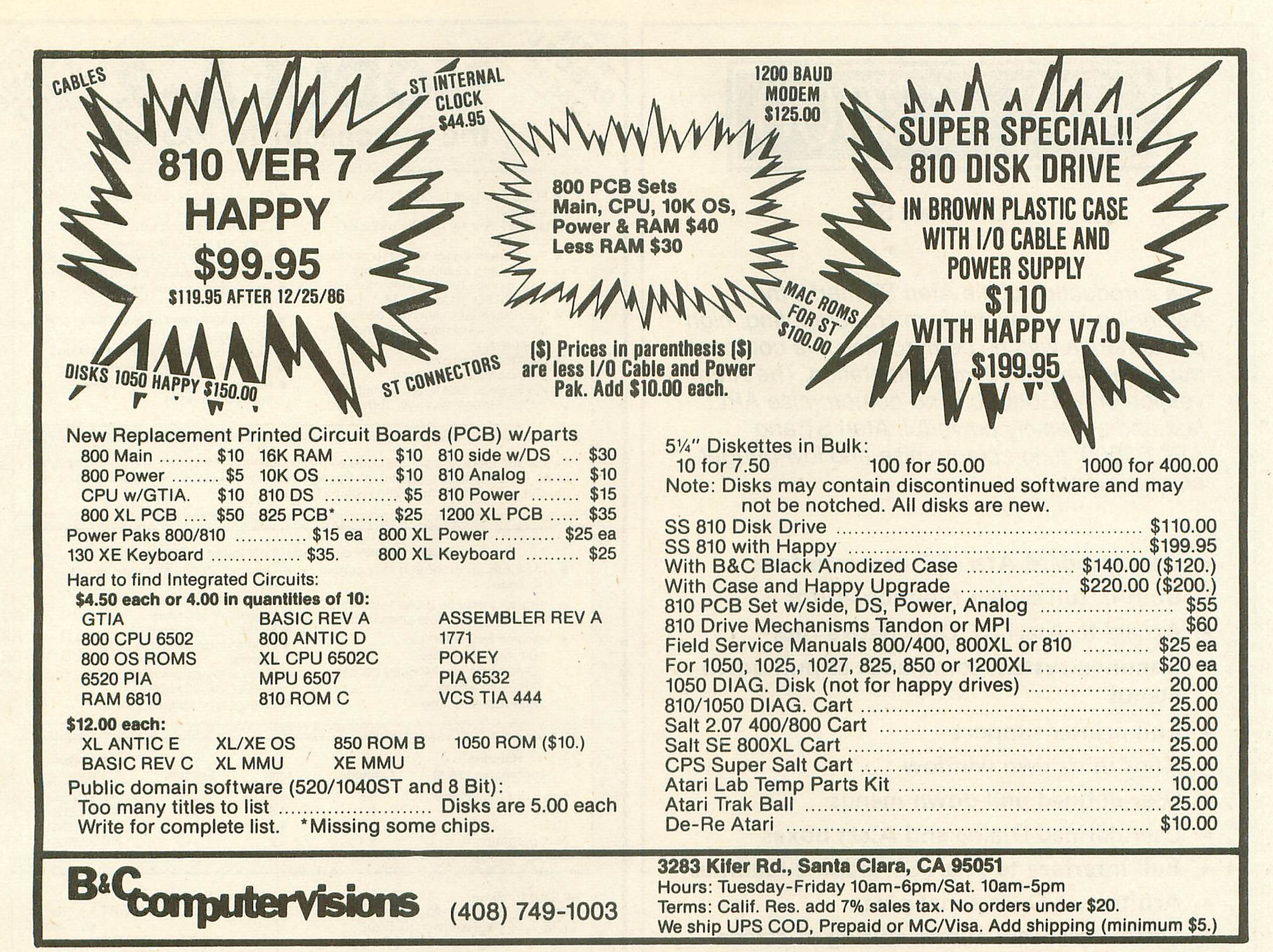
```
5950  '
5960  UPDATE.SHIELDS:
5970   gotoxy 2,11: print " Shields ->  ";
5980   print using"####_%  ";SS,SG;
5982   print using"   ####";SE,ST: return
5990  '
6000  UPDATE.PHASERS:
6010   gotoxy 2,12: print " Phaser   ->  ";
6020   print using"####_%  ";PS,PG;
6022   print using"   ####";PE,PT: return
6030  '
6040  STAT.UPDATE:
6050   color 2: gotoxy 2,13: print " New Total ------------->";
6060   print using"   ####";TMPI,TMPT: color 3
6070  return
6080  '
6090  SHOW.AUTHORIZATION.MESSAGE:
6100   color 1: gotoxy 2,14
6102   print "             # AUTHORIZE #          "
6110   color 1: gotoxy 2,15
6112   print "             #  REPAIRS  #          "
6120   color 2: gotoxy 2,16
6130   print  FOE;"Klingons  ";NPI;"Energy   ";NDATE;"Days"
6140  return
6150  '
6160  XREPAIR:
6170   if RED.ALERT=TRUE then return
6180   PI=PI+TOTE*10: DATE=DATE+TOTT*10: gotoxy 44,2: print  BELL$
6190   if HOME=ACTIVE then PI=0
6200   COMP=100-CG: PHASE=100-PG: TOR=100-TG: SHE=100-SG
6210  ALT.XREPAIR:
6220   color 3,3,3,1: KY=140
6230   for KX=383 to 590 step 95: pcircle KX,KY,28: next
6240   KY=103: for KX=383 to 590 step 95: pcircle KX,KY,28: next
6250  return
6260  '
6270  SETUP:
6280   for X=0 to 7: for Y=0 to 7: MAP%( X,Y )=-1: next: next
6290   for XX=0 to 450
6300      X=int( RND*8 ): Y=int( RND*8 )
6310      if MAP%( X,Y )>-9 then MAP%( X,Y )=MAP%( X,Y )-1
6320   next
6322   FOE=0
6330   for XX=0 to int( RND*3 )+30+HCAP
6340      X=int( RND*8 ): Y=int( RND*8 )
6342      IT=MAP%( X,Y )
6350      if IT>-30 then MAP%( X,Y )=( IT-10 ): FOE=FOE+1
6360   next
6370   for XX=0 to int( RND*3 )+3
6380      X=int( RND*8 ): Y=int( RND*8 )
6390      if MAP%( X,Y )>-100 then MAP%( X,Y )=MAP%( X,Y )-100
6400   next
6410  return
6420  '
6430  FLASH:
6440   KOL=KOL+256: if KOL>1792 then KOL=0
6450   KOL%( 0 )=KOL: for A=1 to 3: KOL%( A )=KOL+1: next
6460   defdbl K: K = 1114: poke K,varptr( KOL%( 0 ) )
6470  return
6480  '
6490  KOLOR:
6500   A#=GB: CONTROL=peek( A# ): GINTIN=peek( A#+8 )
6510   for A=0 to 3: read B: KOL%( A )=B: next
6520   defdbl K: K = 1114: poke K,varptr( KOL%( 0 ) )
6530  return
6540  '
6550  COLOR.STRING.0:
6560   data 2,1287,7,1891
6570  COLOR.STRING.1:
6580   data 1,1536,7,1891
6590  COLOR.STRING.2:
6600   data 1600,1600,1600,2
6610  COLOR.STRING.3:
6620   data 2,83,7,1891
6630  '
```

```
5950 :00FA
5960 :050B
5970 :0A5C
5980 :083C
5982 :0A58
5990 :00FE
6000 :0507
6010 :09E6
6020 :0828
6022 :0A44
6030 :00F0
6040 :0431
6050 :0F5D
6060 :0B3E
6070 :036D
6080 :00F5
6090 :089C
6100 :06BE
6102 :063B
6110 :06C0
6112 :0597
6120 :06C3
6130 :0F57
6140 :036B
6150 :00F3
6160 :0322
6170 :09EA
6180 :1038
6190 :0776
6200 :0C2D
6210 :042D
6220 :05E7
6230 :0E59
6240 :1009
6250 :036D
6260 :00F5
6270 :029A
6280 :0E4F
6290 :04B1
6300 :07F2
6310 :0B1A
6320 :028A
6322 :0214
6330 :08C5
6340 :07F6
6342 :03DA
6350 :0B28
6360 :028E
6370 :0752
6380 :07FA
6390 :0BDA
6400 :0289
6410 :036B
6420 :00F3
6430 :0275
6440 :09A1
6450 :0C13
6460 :0BE1
6470 :0371
6480 :00F9
6490 :0294
6500 :0BE4
6510 :0A3E
6520 :0BDE
6530 :036E
6540 :00F6
6550 :04EC
6560 :04FD
6570 :04EF
6580 :04FB
6590 :04F2
6600 :0571
6610 :04EC
6620 :0493
6630 :00F6
```

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```
6640 SET.MOUSE.SHAPE:
6650  poke CONTRL,78: poke CONTRL+2,1
6660  poke CONTRL+4,1: poke CONTRL+6,1
6670  poke CONTRL+8,0: poke GINTIN,POINTER
6680  gemsys( GRAF.MOUSE )
6690 return
6700 '
6710 SHOW:
6720  poke CONTRL,122: poke CONTRL+2,0
6730  poke CONTRL+6,1: poke CONTRL+12,HANDLE
6740  poke INTIN,0
6750  vdisys( 0 )
6760 return
6770 '
6780 SHRINKBOX:
6790  poke CONTROL,74: poke CONTROL+2,8
6800  poke CONTROL+4,1: poke CONTROL+6,0
6810  poke CONTROL+8,0: poke GINTIN,QX
6820  poke GINTIN+2,QY: poke GINTIN+4,6
6830  poke GINTIN+6,6: poke GINTIN+8,16
6840  poke GINTIN+10,24: poke GINTIN+12,142
6850  poke GINTIN+14,70
6860  gemsys( GRAF.SHRINKBOX )
6870 return
6880 '
6890 GROWBOX:
6900  poke CONTROL,73: poke CONTROL+2,8
6910  poke CONTROL+4,1: poke CONTROL+6,0
6920  poke CONTROL+8,0: poke GINTIN,QX
6930  poke GINTIN+2,QY: poke GINTIN+4,6
6940  poke GINTIN+6,6: poke GINTIN+8,177
6950  poke GINTIN+10,24: poke GINTIN+12,142
6960  poke GINTIN+14,70
6970  gemsys( GRAF.GROWBOX )
6980 return
6990 '
7000 POLYLINE:
7010  poke CONTRL,6: poke CONTRL+2,PN
7020  poke CONTRL+4,0: poke CONTRL+12,HANDLE
7030  poke PTSIN,0+X: poke PTSIN+2,0+X
7040  poke PTSIN+4,639-X: poke PTSIN+6,0+X
7050  poke PTSIN+8,639-X: poke PTSIN+10,199-X: poke PTSIN+12,0+X
7060  poke PTSIN+14,199-X: poke PTSIN+16,0+X: poke PTSIN+18,0+X
7070  vdisys( 0 )
7080 return
7090 '
7100 PRSTRING:
7110  read ST,XST,YST
7120  poke CONTRL,8: poke CONTRL+2,1
7130  poke CONTRL+6,ST: poke CONTRL+12,HANDLE
7140  for X=0 to ST*2-1 step 2: read CH: poke INTIN+X,CH: next
7150  poke PTSIN,XST: poke PTSIN+2,YST
7160  vdisys( 0 )
7170 return
7180 '
7190  data 23,226,8,9,0,0,0,70,0,85,0,69
7200  data 0,76,0,0,0,76,0,79,0,87,0,0,0,9
7210 PSTRING.001:
7220  data 23,226,8,237,0,0,0,83,0,84,0,65,0,82,0,84,0,82,0,69
7230 COLOR.STRING.4:
7240  data 0,75,0,0,0,237
7250 PSTRING.002:
7260  data 34,42,20,84,72,69,0,0,71,65,76,65,88,89,0,0,0,0,0,0,0
7270  data 80,82,69,83,69,78,84,0,81,85,65,68,82,65,78,84
7280 RED.MESSAGE:
7290  data 23,388,20,42,0,0,82,0,69,0,68
7300  data 0,0,0,65,0,76,0,69,0,82,0,84,0,0,42
```

6640	:054C
6650	:0962
6660	:0988
6670	:0B12
6680	:0694
6690	:0375
6700	:00F4
6710	:0249
6720	:0985
6730	:0B30
6740	:045E
6750	:03F5
6760	:0373
6770	:00FB
6780	:03C7
6790	:0A08
6800	:0A21
6810	:09E5
6820	:09EE
6830	:09B4
6840	:0A6B
6850	:056E
6860	:07C3
6870	:0375
6880	:00FD
6890	:0339
6900	:0A00
6910	:0A23
6920	:09E7
6930	:09F0
6940	:09EE
6950	:0A6D
6960	:0570
6970	:0735
6980	:0377
6990	:00FF
7000	:036D
7010	:098D
7020	:0B26
7030	:0999
7040	:0A71
7050	:0FFA
7060	:0FC0
7070	:03F1
7080	:036F
7090	:00F7
7100	:037B
7110	:0563
7120	:0924
7130	:0BA1
7140	:1009
7150	:0A35
7160	:03F1
7170	:036F
7180	:00F7
7190	:07F2
7200	:0841
7210	:03EA
7220	:0C1D
7230	:04EC
7240	:050B
7250	:03EF
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7270	:0B83
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7290	:07FB
7300	:08FF



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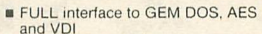
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the successor to Pascal

FOR ATARI 520ST

- FULL interface to GEM DOS, AES and VDI
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Pascal and Modula-2 source code are nearly identical. Modula-2 should be thought of as an enhanced superset of Pascal. Professor Niklaus Wirth (the creator of Pascal) designed Modula-2 to replace Pascal.

Added features of Modula-2 not found in Pascal

- CASE has an ELSE and may contain subranges
- Programs may be broken up into Modules for separate compilation
- Machine level interface
  - Bit-wise operators
  - Direct port and Memory access
  - Absolute addressing
  - Interrupt structure
- Dynamic strings that may be any size
- Multi-tasking is supported
- Procedure variables
- Module version control
- Programmer definable scope of objects
- Open array parameters (VAR r: ARRAY OF REALS;)
- Elegant type transfer functions

Ramdisk Benchmarks (secs)	Compile	Link	Execute	Optomized Size
Sieve of Eratosthenes:	6.2	4.3	3.5	2600 bytes
Float	6.4	4.8	8.3	4844 bytes
Calc	5.5	4.2	3.3	2878 bytes
Null program	5.1	3.2	—	2370 bytes

```
MODULE  Sieve;
CONST   Size = 8190;
TYPE    FlagRange = [0..Size];
        FlagSet = SET OF FlagRange;
VAR     Flags: FlagSet;
        i:     FlagRange;
        Prime, k, Count, Iter: CARDINAL;
BEGIN   (*$S-,$R-,$A+ *)
  FOR Iter:= 1 TO 10 DO
    Count:= 0;
    Flags:= FlagSet(); (* empty set *)
    FOR i:= 0 TO Size DO
      IF (i IN Flags) THEN
        Prime:= (i * 2) + 3; k:= i + Prime:
        WHILE k <= Size DO
          INCL (Flags, k);
          k:= k + Prime;
        END;
        Count:= Count + 1:
      END;
    END;
  END;
END Sieve.
```

```
MODULE Float;
FROM MathLib0 IMPORT sin, ln, exp,
                     sqrt, arctan;
VAR x,y: REAL; i: CARDINAL;
BEGIN (*$T-,$A-,$S-*)
  x:= 1.0;
  FOR i:= 1 TO 1000 DO
    y:= sin (x); y:= ln (x); y:= exp (x);
    y:= sqrt (x); y:= arctan (x);
    x:= x + 0.01;
  END;
END float.
```

```
MODULE calc;
VAR a,b,c; REAL; n, i: CARDINAL;
BEGIN (*$T-,$A-,$S-*)
  n:= 5000;
  a:= 2.71828; b:= 3.14159; c:= 1.0;
  FOR i:= I TO n DO
    c:= c*a; c:= c*b; c:= c/a; c:= c/b;
  END;
END calc.
```

Product History

The TDI Modula-2 compiler has been running on the Pinnacle supermicro (Aug. '84), Amiga (Jan. '86) and will soon appear on the Macintosh and UNIX in the 4th Qtr. '86.

Regular Version $79.95 Developer's Version $149.95 Commercial Version $299.95

The regular version contains all the features listed above. The developer's version supplies an extra diskette containing a symbol file decoder – link and load file disassemblers – a source file cross referencer – symbolic debugger – high level Windows library Module – Ramdisk and Print Spooler source files – Resource Compiler. The commercial version contains all of the Atari module source files.

Other Modula-2 Products

Kermit	– Contains full source plus $15 connect time to Compuserve.	$29.95
Examples	– Many Modula-2 example programs to show advanced programming techniques	$24.95
GRID	– Sophisticated multi-key file access method with over 30 procedures to access variable length records.	$49.95



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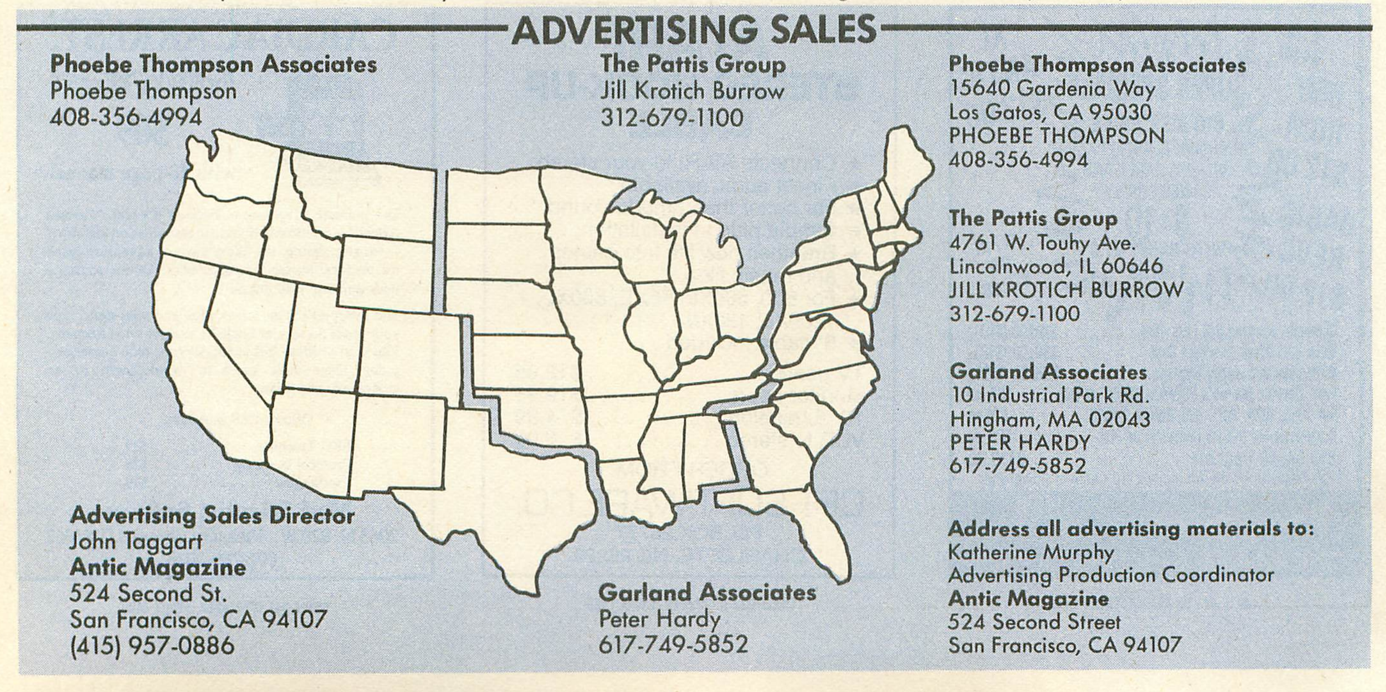
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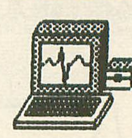
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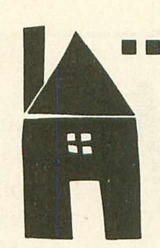
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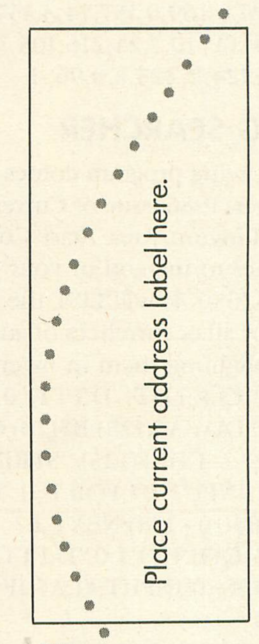
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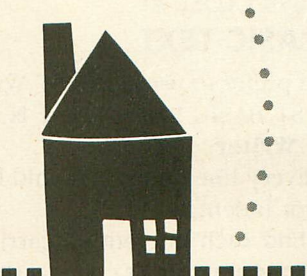
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BY BILL MARQUARDT, ANTIC TECHNICAL ASSISTANT

We continue to get queries about using the extra 16K RAM of Atari XL computers as a RAMdisk. The following approach to doing this came all the way from Australia, written by Larry Nocella of the New South Wales Atari Computer Enthusiasts.

1. Boot with DOS 2.5 and BASIC.
2. POKE 1802,PEEK(1802)+128
3. Type DOS and press [RETURN]
4. Write DOS with option [H].

Now type in the following program and RUN it to create an AUTORUN.SYS file on the same disk. Thereafter, when you boot with that disk you will have a 101-sector RAMdisk available as D8. After formatting, it will say, "499 Sectors Free." But don't believe it!

```
20 OPEN #1,8,0,"D:AUTORUN.SYS":TRAP 50
30 READ X:IF X=-1 THEN 50
40 PUT #1,X:GOTO 30
50 CLOSE #1:END
100 DATA 255,255,0,96,43,96,162,32,169,254,157,66,
3,169,39,57,68,3,169,96,157,69,3
110 DATA 169,0,157,74,3,157,75,3,32,86,228,173
120 DATA 10,7,24,216,105,128,141,10,7,96,68,56,58,
155,0,224,2,225,2,0,96,-1
```

STRING SEARCHER

The following program comes from Mark Brown in the September, 1986 issue of Current Notes, the magazine of the Washington Area Atari Computer Enthusiasts. Add these lines to the end of your BASIC program and type GOTO 32650. It will LIST the file to disk as D:TTT and search for all occurrences of any string you are searching for, highlighting them in inverse video.

```
32650 CLR:LIST "D:TTT",0,32649
32651 DIM A$(128),B$(20),C$(20)
32652 ? CHR$(125);"STRING TO BE SEARCHED
FOR";:INPUT B$:FOR I=1 TO LEN(B$):C$(I)=CHR$
(ASC(B$(I))+128):NEXT I:?
32653 OPEN #1,4,0,"D:TTT":TRAP 32658
32654 R=0:INPUT #1,A$:IF LEN(A$)<LEN(B$) THEN
32654
32655 FOR J=1 TO LEN(A$)-LEN(B$)+1:IF A$(J,J+LEN
(B$)-1)=B$ THEN A$(J,J+LEN(B$)-1)=C$:J=J+LEN
(B$)-1:R=1
32656 NEXT J:IF R=1 THEN ? A$;CHR$(253);CHR$
(253)
32657 GOTO 32654
32658 CLOSE #1
```

ST BASIC TEXT

If you prefer to use either ST Writer or 1st Word to type your ST BASIC listings, here is the best way to do it.

ST Writer:

1. Every line number should begin at the left margin. Do not indent.
2. End each line with a carriage return.
3. Erase any printer codes at the head of the BASIC program. Replace them with this line: [CONTROL]-L, 0, [SPACE], [CONTROL]-R, 3, 0, 0, [SPACE], [CONTROL]-T, 0, [SPACE], [CONTROL]-B, 0, [SPACE], [RETURN]. (Those are zeros, not the capital letter O.)
6. Put the cursor on the first line and type: [SHIFT]-F7, [RETURN], [ESC] followed by [CONTROL]-0, 1, 0, [SPACE], [RETURN], [ESC]. (Zeros again.)
7. When process is complete, PRINT the file to disk.

You now have a usable ST BASIC program. This tip was written by Brian Duggan and appeared in the July-August issue of ASTUN (Atari ST Users News), Murray, Utah.

1st Word:

Just take 1st Word out of WP (word processor) mode by clicking on that menu option and type in your program. If you don't want to type in line numbers, use labels in your code where appropriate and RUN the following ST BASIC program after your source code is saved to disk and before you attempt to LOAD it with BASIC.

```
10 num=10
20 fullw 2:clearw 2:gotoxy 0,0
30 input "Input file: ";file1$
40 input "Output file: ";file2$
50 open "I",#2,file1$
60 open "O",#3,file2$
70 on error goto 200
80 while 1:line input #2,ln$
90 print #3,lnum;" ";ln$
100 lnum=lnum+10:wend
200 close: end
```

The above is an abbreviated version of a program by Mike Fulton from the June, 1986 issue of OrnJuice, the newletter of the Atari Computer Association of Orange County.

TOS TIPS

If you would like TOS to recognize extensions other than .PRG, .TOS, and .TTP when double-clicked from the desktop, use your word processor to edit the DESKTOP.INF file. For instance, inserting this line:

```
#G 03 FF *.EXE@ @
```

will allow the ST to run *.EXE applications from the desktop. Make sure the spacing is the same as the other lines in the file. This tip from Robert Mann was also in the issue of ASTUN mentioned above.

A time saving feature of the GEM desktop that you may be unaware of is that you may select a file from a window other than the "front" window by holding down the right mouse button while you press the left button.

If you have a Tech Tip that you would like to share with other readers, send it along to Antic Tech Tips, 524 Second Street, San Francisco, CA 94107. You might get your name in print. We always welcome very short programs that demonstrate the Atari's powers, simple hardware modifications, or useful macros for popular software.

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